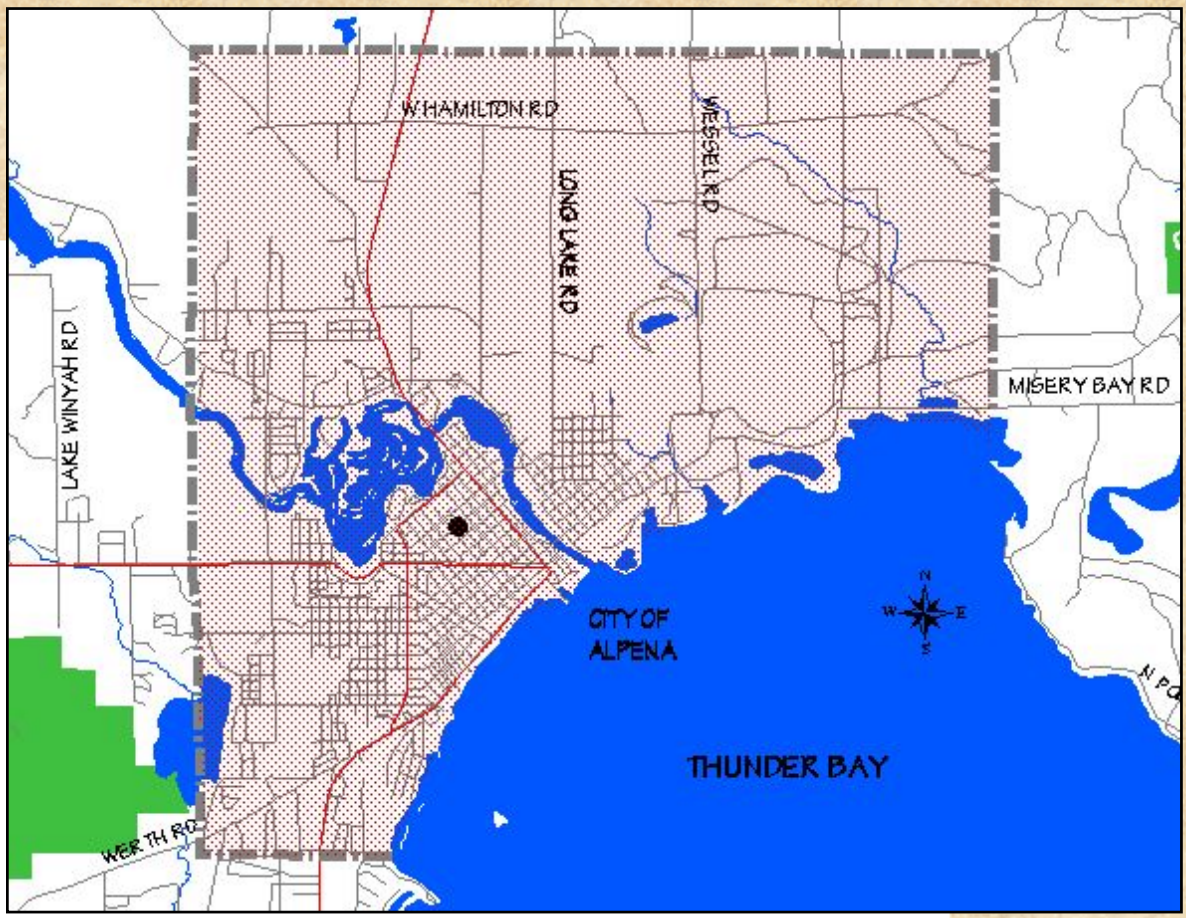
# Alpena Eco-Plan

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# Chapter 1 - Introduction

## Background

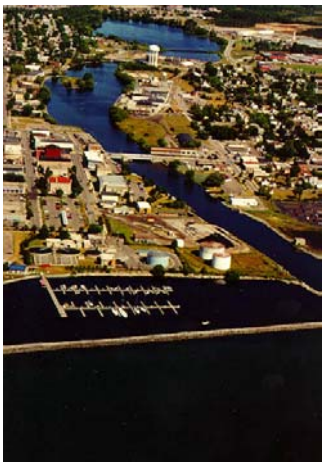
In cooperation with the Michigan Department of Environmental Quality's Coastal Zone program, and coastal communities in the region, the Northeast Michigan Council of Governments has explored the opportunities and approaches available to establish the "Huron Greenways." The Huron Greenways is an organized system of land and water trails and routes linking the coastal portions of Alcona, Alpena, Presque Isle and Cheboygan Counties.

This Huron Greenways study, completed in 2000, included an extensive inventory of potential greenway sites, and suggested greenway routings. Existing public use areas were identified, along with existing trail systems and linkages. Important ecological features present in the greenways system were identified and described. Key recreational features were catalogued as well, along with historical sites, communities, and traveler services. Finally, the report made a number of recommendations on how the greenways system might be put into place, and what resources might be needed to maintain and improve the overall system.

The Huron Greenways web site has been developed and can be viewed at www.hurongreenways.info The site contains information on the main trail system, local trails, recreational sites database, photo tour, detailed tour maps, and travel information. The Huron Greenways Study, that laid the groundwork for subsequent activities such as the Alpena Eco-Plan, can also be viewed on the web site.

The Huron Greenways traverses a part of Michigan rich in ecological resources. Ecological corridors include river systems, wetlands and forests that reach inland connecting coastal areas to interior Michigan. The Lake Huron shoreline forms another ever changing, narrow ecological corridor that can be less than 100 feet wide, but runs for over 1000 miles encircling this Great Lake. The nearshore terrestrial ecosystems create a sharp transition zone between Lake Huron waters and the inland resources of Northeastern Michigan. Habitats include Great Lakes marshes, low sand dunes, limestone bedrock shorelines, cobble beaches, dune and swale complexes, wet meadows, northern fens, conifer and lowland hardwood swamps, and numerous off

shore islands. Plants, such as the Iris lacustris (dwarf lake iris), Tanacetum huronense (Lake Huron tansy), Solidago houghtonii (Houghton's goldenrod), and Cirsium pitcheri (Pitchers thistle), are listed as rare and endangered; and found only in the coastal areas of the northern Great Lakes.



The most prominent river system in Alpena County is the Thunder Bay River. The Thunder Bay River empties into Lake Huron at the City of Alpena after flowing through several large impoundments including Lake Winyah and Besser Lake. Bike trails in the City of Alpena follow along the shore of Besser Lake and the Wildlife Sanctuary, offering glimpses of flooded river oxbows and remnant floodplain islands. The Thunder Bay River is a significant regional ecological corridor with headwaters that arise in western Montmorency County near the community of Lewiston. Other branches of the Thunder Bay River extend into Presque Isle, Alcona and Oscoda Counties.

While the overall ecological integrity of the Thunder Bay River system is still very good, the natural terrestrial ecosystems have been fragmented within the City of Alpena. Urban-suburban development over the last 100 years has resulted in the loss of natural habitats. The most extensive fragmentation has occurred at the mouth of the river system. Both residential and commercial development has been occurring around the periphery of the City of Alpena. The rings of urbanizing landscape are replacing natural habitat with shopping centers, roads, subdivisions and parking lots. Use of open space design techniques, conservation easements or fee simple purchase will reduce the loss of important wildlife habitat.

**Benefits of Ecological Corridors**

Maintaining and improving the ecological web of greenspace and natural areas will have a direct impact on the quality of life in the community. Undeveloped areas can serve as the "lungs" to ventilate adjacent developed areas. The filtering, shading and cooling effects of forests can have positive microclimate and air quality impacts on surrounding areas. A carefully planned network of greenspaces can act as a pollution filter and temperature moderator; keeping silt and nutrients out of streams and preserving fisheries habitat. By bringing nature close to hand, greenways can also perform an important role in environmental education. With easy access to natural resources, the public is much more likely to support resource preservation, and feel that they have an individual stake in maintaining high environmental quality.

"How Greenways Work, A Handbook on Ecology" written by Jonathon Labaree, explains the functions of greenways or ecological corridors. Corridors operate in six basic ways:

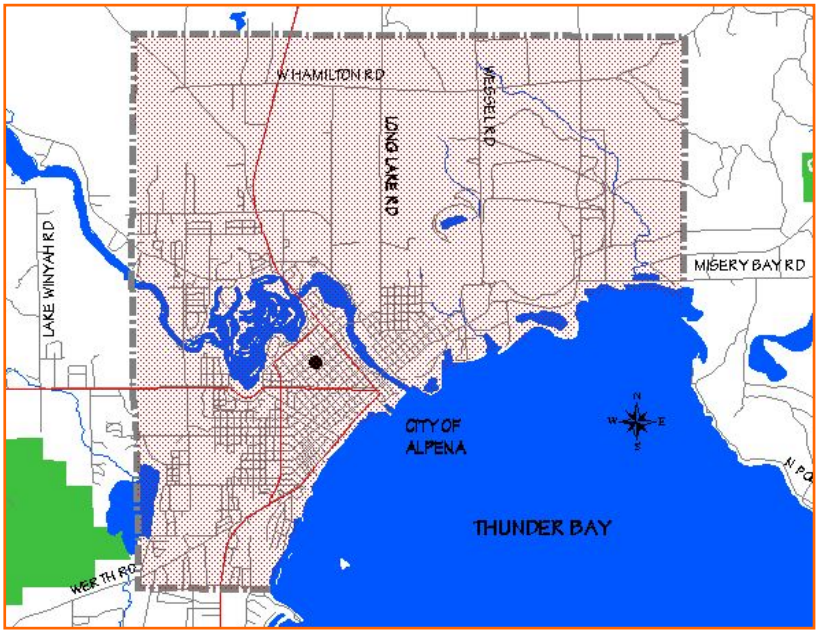
- as habitat for wildlife and plants
- as a conduit for plants, animals, water, sediments and chemicals;
- as a barrier preventing movement;

- as a source for animals or seeds which move to other parts of the landscape;
- as a filter allowing some things to pass while inhibiting others; and
- as a sink for trapping sediment, toxins or nutrients.

It may not be possible for all segments of a corridor to fulfill all six functions. The plan will identify which functions are most important in different areas. For example, narrow railroad corridors can be enhanced to function as conduits allowing animals to move through the landscape. Corridors bordering the Thunder Bay River and Lake Huron shoreline should be planned to filter sediments, nutrients and chemicals, along with providing habitat for wildlife. Larger undeveloped areas and wetlands can have a wide range of ecological functions.

**Location of Study Area**

Alpena County is located in the Northeastern Lower Peninsula of Michigan. The City of Alpena is located in the eastern edge of Alpena County, on Thunder Bay of Lake Huron. The planning area includes the City of Alpena and portions of Alpena Township around the border of the City. Figure 1.1 shows the Eco-Plan coverage area. The total planning area covers approximately 22 square miles and is 5.5 miles by 5.5 miles. While it is understood the ecological corridors extend beyond the project boundaries, given the project funding amounts and scope, it was decided to focus on the area with the greatest need.




**Plan Development**

The purpose of the Alpena Eco-Plan is to establish a process to preserve and improve priority ecological corridors. The first step was to develop an accurate representation of the existing conditions. A number of data sets were developed and input into NEMCOG's Geographic Information System (GIS). Existing parks, natural areas, undeveloped areas and vacant land were Identified and mapped. Next, ecological corridors, both in tact and fragmented, were identified and mapped. Ownership information was gathered for the corridors. Next, an on-site inventory of the resources within the corridors was completed.

An Eco-committee was formed to guide the plan development. Committee members and organizations included: Carol Shafto, Alpena City Council; Marie Nadeau, City of Alpena Planning Commission; Ann Glawe, Wildlife Sanctuary Committee; Dave McArthur, Citizen-at-Large; Megan Oemke, Lafarge Corporation; Greg Sundin, City of Alpena Planning Department; Bill Bartow, Alpena County Planning Commission; Marie Twite, Alpena Township; Mary Dunkle, MSU Cooperative Extension; Pam Troy, Alpena County Conservation District and Richard Deuell, Northeast Michigan Council of Governments.

Under the authority of the Municipal Planning Act P. A. 285 of 1931, the Alpena Planning Commission can adopt the Eco-Plan. The plan can be used to guide development and to seek funding for implementing recommendations. An additional intent beyond the context of this project, is to develop an ecological corridor plan that can be used as a model for other communities in the coastal zone area.

# Chapter 2 – Inventory of Existing Conditions

## Inventory Procedures

A critical step of this planning process was to develop an accurate representation of existing environmental conditions within the study. This chapter will present a series of maps and associated text to describe key features such as parks, natural areas, vegetation types, ecological units and ecological corridors.

NEMCOG used information and digital data sets from the Michigan Resource Information System, U.S. Geological Survey, Alpena Township, Alpena County and City of Alpena. Information from the City of Alpena and Alpena Township Master Plans and Zoning Ordinances was also used developing the existing conditions profile of the study area. The field inventory of existing conditions was completed in the winter of 2002.

## Geology and Landforms

Limestone bedrock laid down over 300 million years ago and glacial landforms created over 10,000 years ago influence types and locations of present day plant communities. This section will describe the glacial landforms or quaternary geology and the underlying bedrock geology.

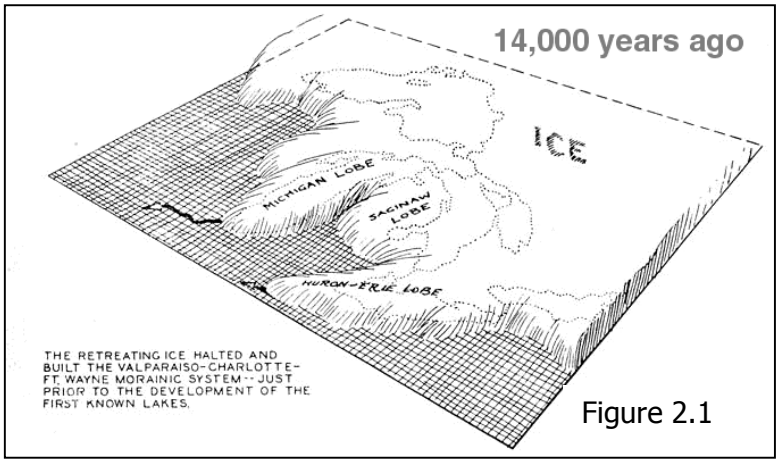
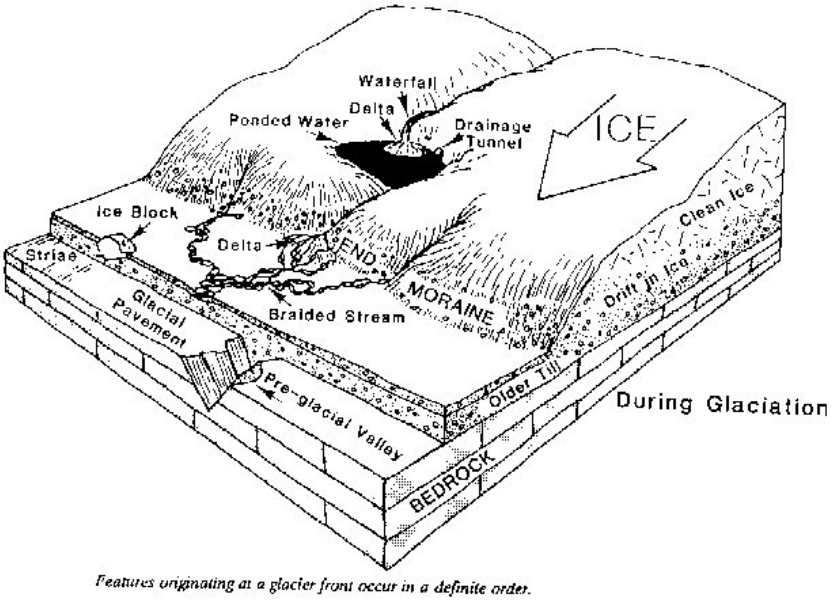


Figure 2.1

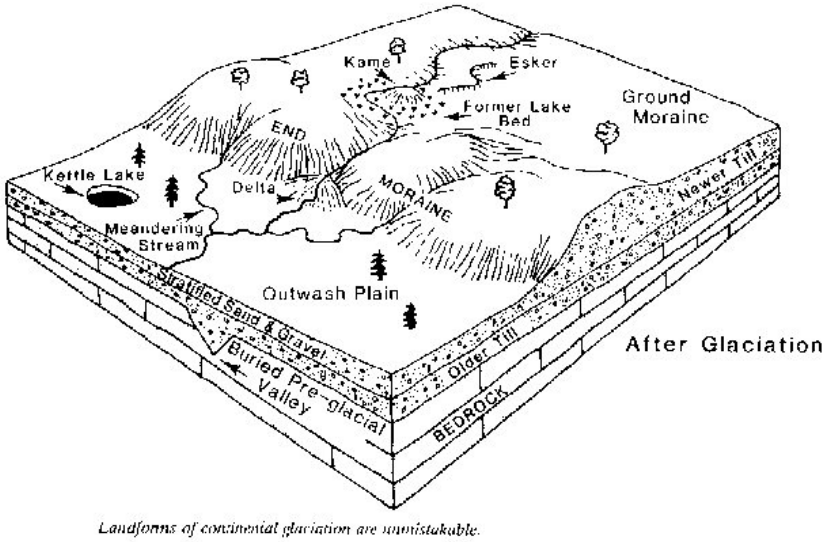
Starting some 2 million years ago, during the Pleistocene era, continental glaciers formed in the Hudson Bay area. Several times, over this two million year period, the massive sheets of ice built up and inched their way south across what is today Michigan. The massive ice sheets, more than one mile thick, advanced in a southerly direction, bulldozing their way across the landscape. The glacier pushed material in front of it, incorporated rocks and soil into the debris laden ice; and scraped, ground and broke apart the sedimentary bedrock of the Michigan Basin.

Each advance and retreat of the continental glaciers took tens of thousands of years. This reoccurring process shaped and reshaped the land; first obliterating and then creating hills, valleys, rivers and lakes, swamps and marshes. The last glacial period, called the Wisconsin era, created the landscape we know today. The glacier left behind boulders, rocks, cobble, sand, gravel, silt, clay and loam. In some areas the material was deposited in unsorted masses called till plains, ground moraines and end moraines. Water flowing from the melting glaciers also sorted materials, creating outwash channels, sand deltas, kames and eskers. Fine materials, captured in the fast moving glacial meltwater, settled to the bottom of expansive glacial lakes creating lacustrine

clay and silt plains. **Figure 2.2** from "The Glacial Lakes around Michigan" by Kelly and Farrand, shows the formation of glacial landforms. According to a map prepared by W. A. Burgess and D. F. Eschman **(Figure 2.3)**, titled "Landform Units in Northeastern Lower Michigan," the Alpena area is divided into two landform units. Essentially, the southern part is in the Ossineke Beach Ridges and the northern part is in the Devils Lake Karst Topography.




*Features originating at a glacier front occur in a definite order.*




*Landforms of continental glaciation are unmistakable.*

Figure 2.2

At the front of the melting glacier, vast lakes formed, these emerging lake basins were the beginnings of the our Great Lakes. During different periods, the post glacial great lakes were both much higher and much lower than the lake levels we have grown accustomed to in recent times. Geologists have identified and named the different post glacial great lake stages for example glacial great lake stages Warren, Algonquin, Nipissing and Algoma. Landforms and soils adjacent to Lake Huron were heavily influenced by these different lake stages. Glacial Great Lake Warren formed at the front of the melting Huron glacial lobe around 12,000 years before present and was the most extensive, flooding the entire study area.

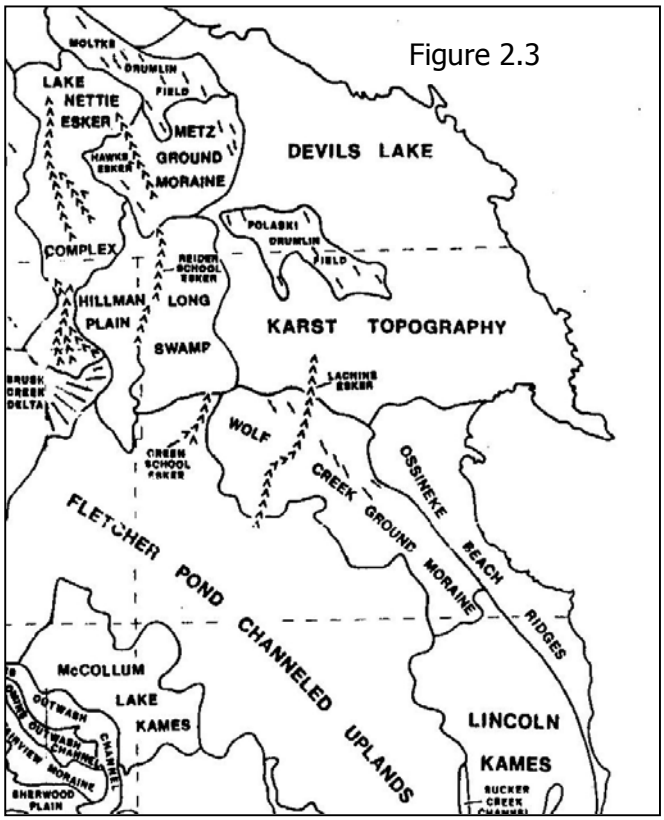



Figure 2.3

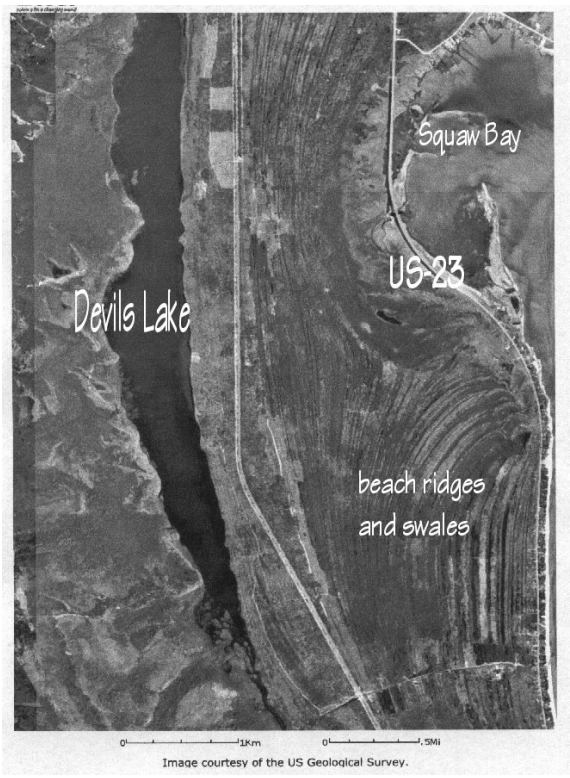
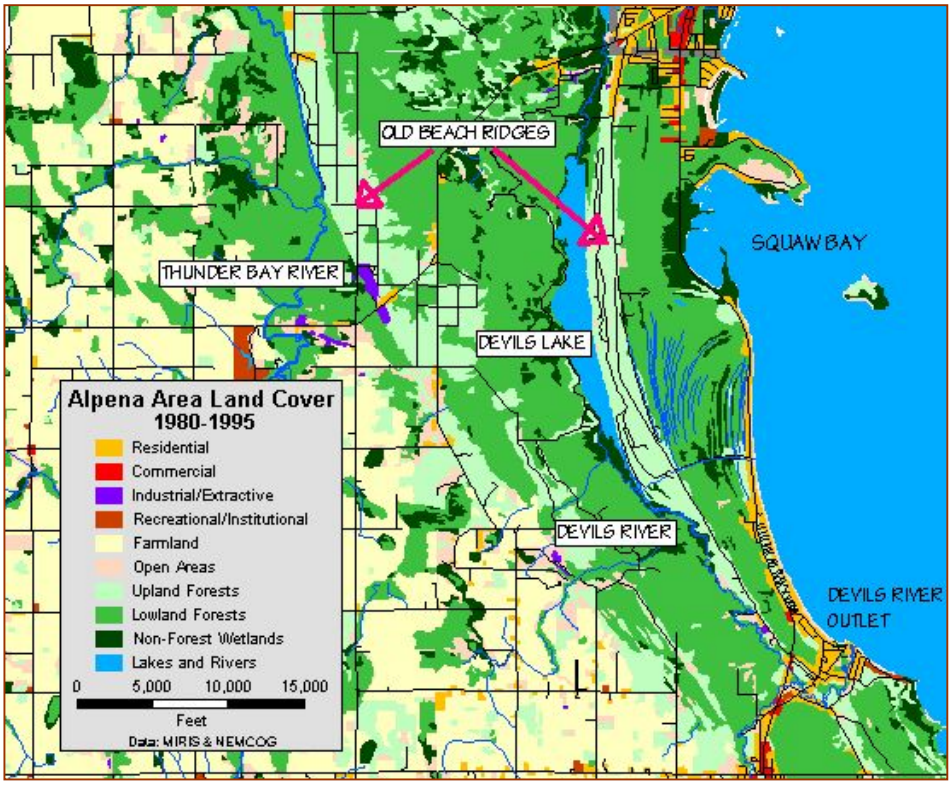



Image courtesy of the US Geological Survey.

The Ossineke Beach Ridge landform, a beach ridge and swale complex, is a series of alternating old beach ridges and linear depressions that parallel the Lake Huron shoreline. As Glacial Lake Warren receded, a series of beach ridges interspersed with low wet areas formed. At times the recession was slow but steady, creating a series of closely spaced low ridges and wet swales. When lake levels receded at a rapid rate, expansive areas of relatively level land were uncovered. Initially the area may have been an emergent coastal wetland like Squaw Bay and Misery Bay is today. As the water table further dropped, lowland brush and eventually lowland conifer and hardwood trees would dominate a site. When the receding lake levels stalled, beaches were built by wave action and deposition of sand washed up on shore. With the low lake levels of Lake Huron, this on-going process can be seen today along the beach areas north of Bare Point.

There were extended periods when the lake recession stalled, and combined with a readily available supply of sand, long wide sandy ridges or low sand dunes were created inland from the present shoreline. A wide sandy ridge, one to two miles inland from the Lake Huron Shoreline, runs from the community of Black River in Alcona County, through Negewagon State Park and Ossineke continuing north into Alpena Township and City of Alpena. Sandhill Road in Alcona County as well as Piper Road in Alpena County follow this dry sandy ridge. The wide sand ridge extends into Alpena Township and the City crossing Werth Road at Hobbs Road, following the west edge of Mud Lake, continuing in a northeasterly direction, crossing the Thunder Bay River and eventually ending northeast of the Thunder Bay Recreation Center.





Sportsman's Island Park is part of this old beach ridge landform. The pine-oak forest on the island is characteristic of forest vegetation found growing in other segments of this old beach ridge or sand dune. Along with being a good place to build roads, the well drained sand ridge is also built up with subdivisions in the southern part of the study area, and the

Sunset Grade School, Alpena High School, Evergreen Cemetery, Alpena Community College and the Thunder Bay Recreation Center are located in this area.

Surface water flowing towards Lake Huron is stopped and diverted by this long linear landform. Rivers abruptly changed directions following the western edge of the old beach ridge, until the flowing water was able to punch through a low area and empty into Lake Huron. The location of the river channels of Mud Creek and Devils River, and the Black River in Alcona County are influenced by the landform. Another old beach ridge five miles inland directs the flow of the South Branch of the Thunder Bay River, northward into the main branch in Lake Wynyha. Since the movement of surface water is blocked by the large sandy ridges, the areas to the west tend to be wetlands. The Black River swamp in Alcona County is a fine example of this. Mud Lake and Devils Lake are located along the western edge of same long beach ridge. At one time these lakes were part of the great lakes.

The presence of limestone bedrock at or near the surface, particularly north of the Thunder Bay River, influences the hydrology and vegetation of the area. Northern white cedar thrives on these shallow soils and is the dominant forest species in both wet and dryer areas north of the Thunder Bay River. Beneath the thin mantel of glacial deposits is sedimentary bedrock that was created during the upper and lower Devonian ages of the Paleozoic Era. The bedrock was formed in ancient seas, which covered the area some 345 to 405 million years ago. The shallow marine seas deposited layers of silt, clay, sediments, marine animals, plants, coral, and other calcareous materials. These deposits formed shale, limestone, and dolomite bedrock. The bedrock is this area is referred to as the Traverse Group. Deposits are further defined as Potter Farm Formation, Norway Point Formation, Four Mile Dam Formation and Alpena Limestone. Rich deposits of Alpena Limestone, Newton Creek Limestone and Genschaw Formation are mined and processed at the Lafarge facility in the northeast part of the study area.

Limestone bedrock or karst geology, greatly influences the surface drainage in the study area, by impeding water percolation into the ground in some locations and by rapidly draining water through bedrock cracks at other sites. The bedrock cracks at the surface are called swallow holes. Large volumes of water can drain into these swallow holes, entering the limestone bedrock aquifers of cracks and porous stone. Water flowing through fractured bedrock will slowly dissolve the limestone, enlarging the network of cracks into subterranean channelways and caves. In some instances the rock above the cavern collapses forming sinkholes. Though no sinkholes are located within the study area, a complex of sinkholes can be found to the north near Rockport, in Presque Isle County.

## Water Resources

Water courses function as the central core of ecological corridors. **Figure 2.4** depicts the water features within the Alpena Eco-Plan. The Thunder Bay River is a corridor of regional importance. The City surrounds the Wildlife Sanctuary and Lake Besser, an

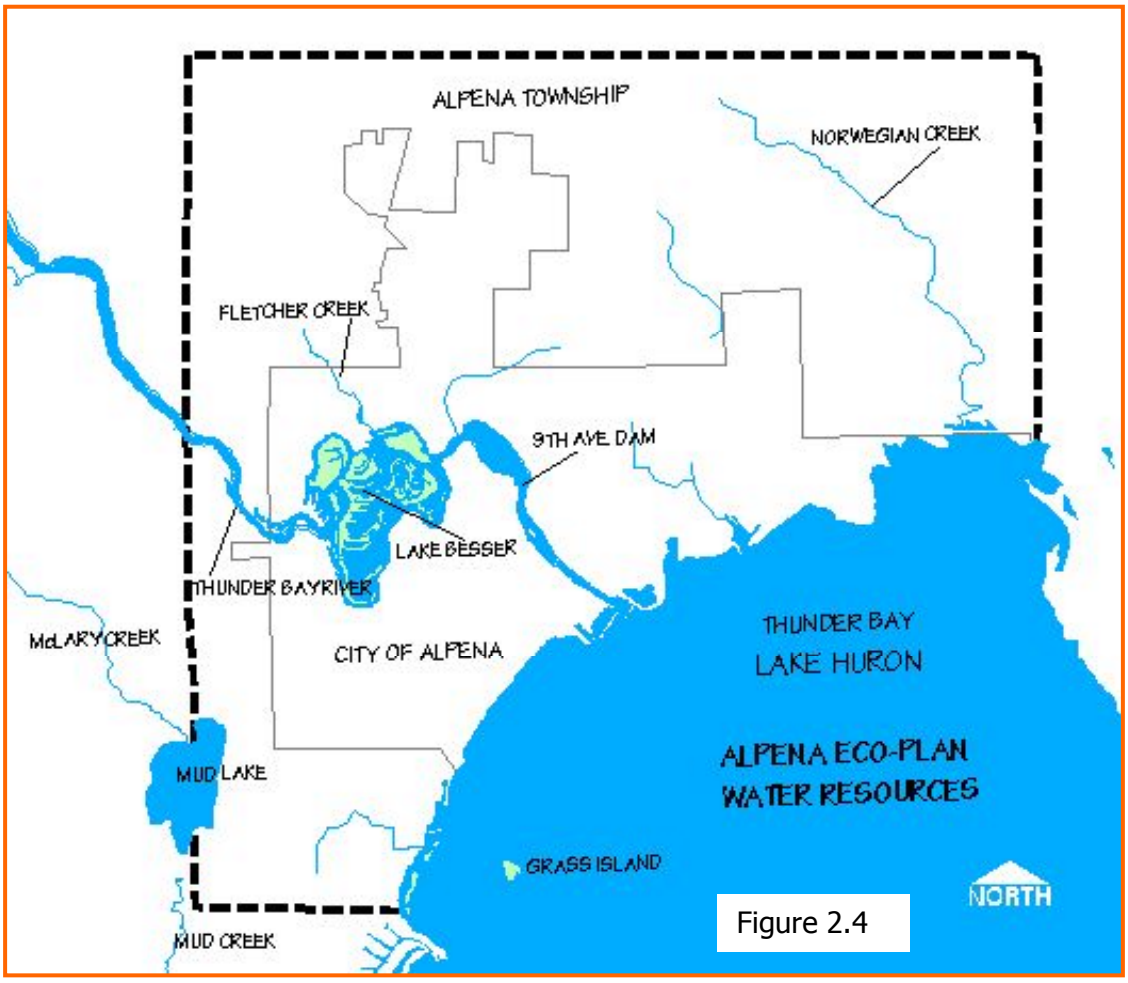



Figure 2.4

impoundment of the Thunder Bay River that contains marshes, narrow curving linear islands and flooded river oxbows. Other water resources include Mud Lake and the Thunder Bay of Lake Huron. Several small creeks include Norwegian Creek, Fletcher Creek, Gilchrist Creek, and Mud Creek. Fletcher and Gilchrist Creeks along with numerous manmade ditches tend to be intermittent, carrying water during spring run-off and heavy rain events.

## Ecological Features

While much of the central core has developed into urbanized land uses over the last 100 years, there are still extensive undeveloped lands bordering the City. The forests, wetlands and open areas provide wildlife habitat, lands for outdoor recreation, protect water quality and bring nature into the city. Within developed portions of the City and Township, the wide expanses of forests and wetlands are squeezed into narrow corridors following rivers, railroads and lakeshores.

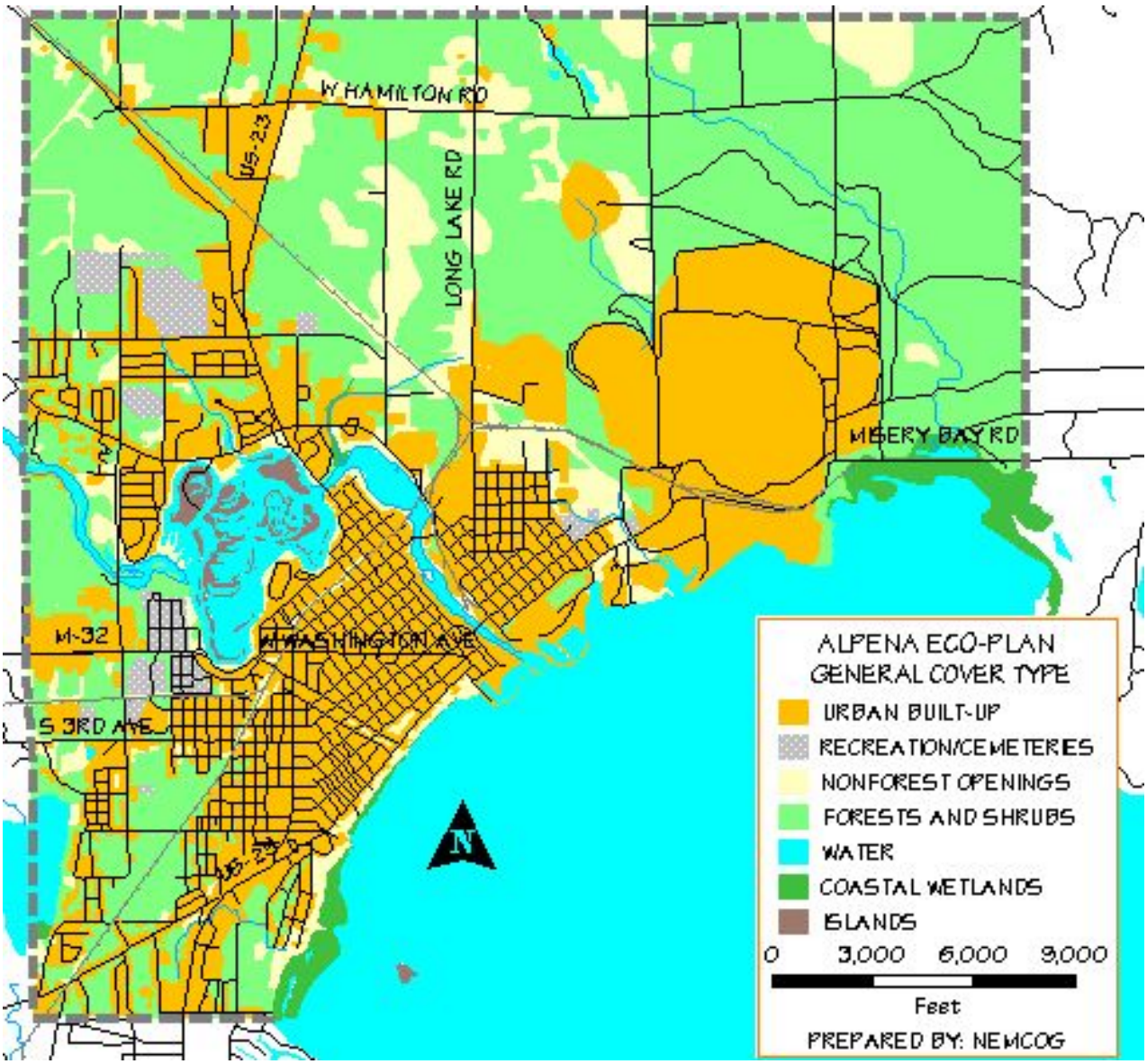
Cover Types

Utilizing reference data such as land cover use maps, topographic maps, and digital aerial photographs, a preliminary Eco-corridor map was generated using Maptitude GIS software. Based on the initial maps, NEMCOG staff conducted a field review to refine boundaries, gather data on vegetation types and conditions, and identify land uses in adjacent urbanized areas. **Figure 2.5** is the Eco-Corridor map for the study area. Seven general land cover types were delineated: forests-shrubs, nonforested open areas, coastal wetlands, islands, water features, recreation/cemeteries and urban built-up.

*Forests-Shrubs:* The forests-shrubs category accounts for the largest area, covering 6,933 acres or 41 percent of the project area.

This high percentage is derived from the extensive undeveloped areas in the Alpena Township portions of the project. In the City, approximately 15 percent of the land area falls within the category. Forests include upland cover types such as jack-red-white pine, aspen-birch, sugar maple-beech and red oak. Northern white cedar thrives on upland sites where limestone bedrock is close to the surface. Lowland forest include lowland conifers and hardwoods, such as northern white cedar, tamarack, black spruce, balsam fir, elm, red maple, willow, black ash, balsam poplar and aspen. Shrubs such as hawthorn, autumn olive, tartarian honeysuckle, spreading junipers can be found growing in upland areas. Speckled alder, willow, and red osier dogwood shrubs dominate wetter areas.

Figure 2.5
Cover type Map


W HAMILTON RD
US-23
LONG LAKE RD
MISERY BAY RD
M-32
WASHINGTON AVE
S 3RD AVE
US-23
N
ALPENA ECO-PLAN
GENERAL COVER TYPE
URBAN BUILT-UP
RECREATION/CEMETERIES
NONFOREST OPENINGS
FORESTS AND SHRUBS
WATER
COASTAL WETLANDS
ISLANDS
0 3,000 6,000 9,000
Feet
PREPARED BY: NEMCOG

The forests-shrubs cover type prevails in the northern portions of the study area. The dominant forest type, on dry and wet sites, is northern white cedar. South of the river, forest types are best described as lowland forests, with aspen, black ash, elm and willow being most common. A sandy ridge, remnants of an old sand dune, that runs from the southwest to the northeast crossing the river at Sportsman's Island, is dominated by red oak, white oak, jack pine and white pine. Shrubs in the undeveloped, mostly wet areas south of the river are speckled alder, willow, and red osier dogwood.

**Table 2.1 Cover Type Summary**

| *Cover Type Area* | *Acres* | *Percent of Study Area* |
|---|---|---|
| **Forests-Shrubs** | 6,933 | 40.96 |
| **Non-Forested Openings** | 1,477 | 8.73 |
| **Coastal Wetlands** | 577 | 3.41 |
| **Islands** | 123 | 0.73 |
| **Water Features** | 757 | 4.47 |
| **Recreation-Cemeteries** | 363 | 2.14 |
| **Urban Built-Up** | 6,694 | 39.55 |
| **Total** | 16,924 | 100 |

*Nonforested Open Areas:* The category covers 1,477 acres or over eight percent of project area. Old farm fields, cleared areas, railroad corridors, marshes and wet meadows are included in this category. The most extensive open areas are located north of the river and include old farm fields, wet meadows and cleared areas. Land bordering the Thunder Bay River, Wildlife Sanctuary and Lake Besser are mapped in this category, with some segments being mowed lawns. The Lake Huron shoreline south of the river mouth and within the City is included in this

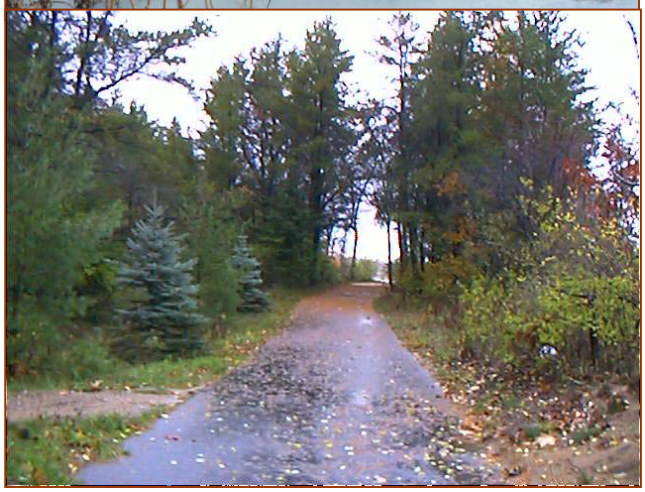
category. These sites are mainly mowed lawns. The railroad corridors and rail-trail (Paxton Spur) are narrow openings that pierce the urban built-up portions of the Township and City. The open areas, particularly in the urban setting, present wonderful opportunities for planting shrubs and trees to enhance wildlife habitat.

*Islands:* Numerous curve-a-linear islands, remnants of past erosive powers of the untamed Thunder Bay River, can be found in the Wildlife Sanctuary. Depending upon the soils and elevation above the average water level, vegetation varies for pine and oak on Sportsman Island; willows and ash on lower islands and speckled alder, red osier dogwood, sedges, and cattails on wetter sites.

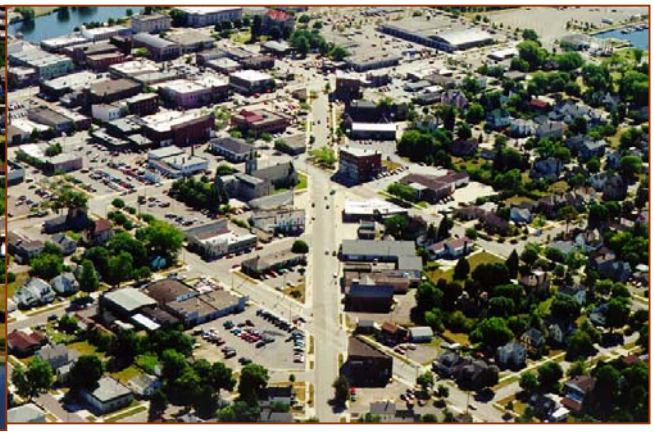
*Coastal Wetlands:* Emergent wetlands border sections of the Lake Huron shoreline. This study delineated 577 acres of Lake Huron coastal emergent wetlands. Sedges, rushes and cattails are common in these areas. The width of the wetlands varies, depending upon the water levels of Lake Huron. Low water levels the last few years have greatly expanded the coastal wetlands.

*Water Features:* Lake Besser, Wildlife Sanctuary, Mud Lake, Thunder Bay River and Thunder Bay are included in this category. Surface water totals 757 acres of the total area. Note, this figure does not include Thunder Bay.

*Recreation-Cemeteries:* Baseball fields, soccer fields, golf courses and cemeteries are included in this category. Vegetation in these areas tends to be mowed lawns. Manicured lawns, while providing open space, have very limited wildlife values. This category accounts for two percent of the project area or 363 acres.



*Urban Built-Up:* The urban category accounts for the second largest area covering 6,694 acres. This category includes residential, commercial, industrial, extractive and institutional land uses.



General Ecological Areas

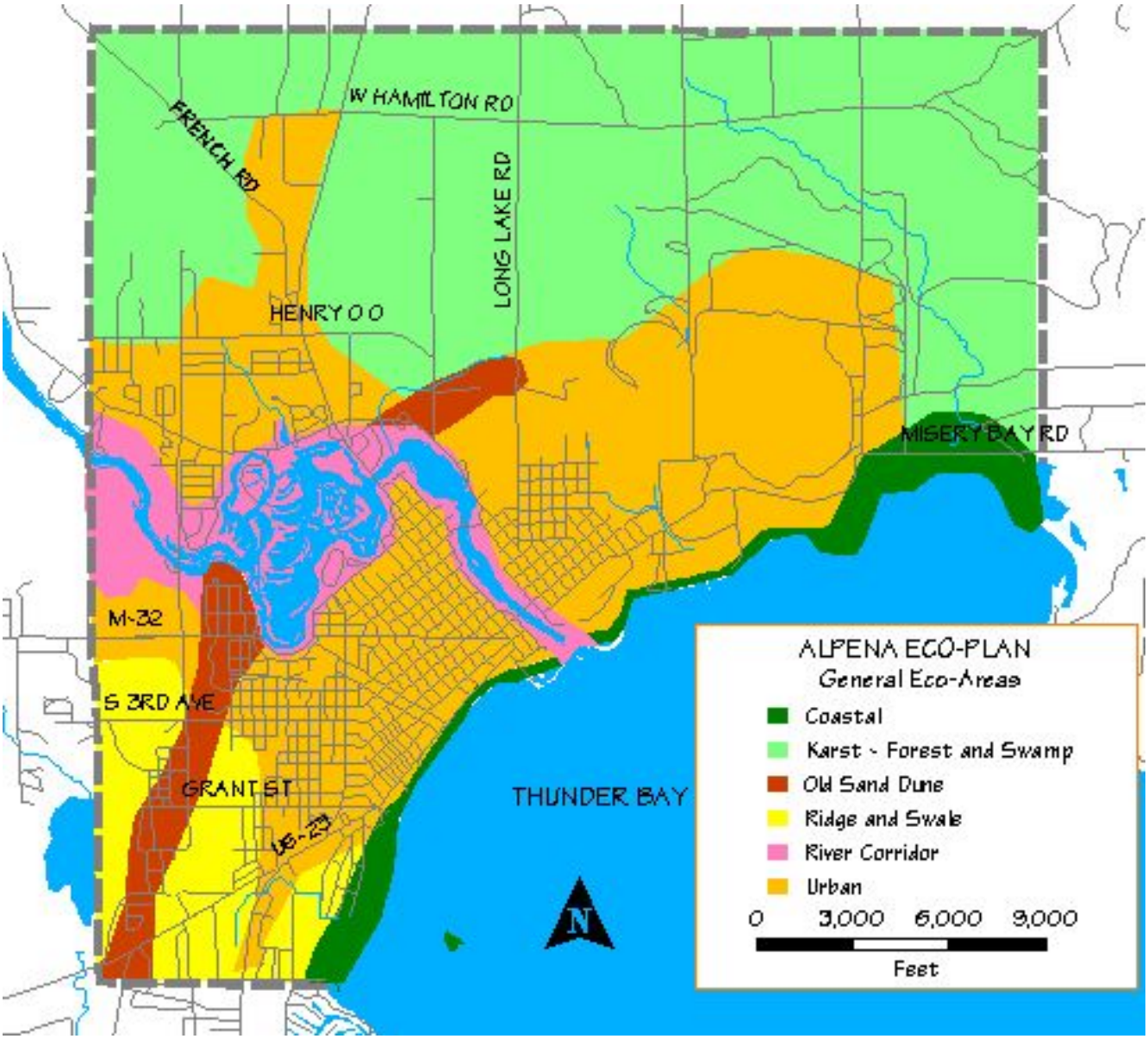
Based on soil conditions, past and current development patterns, geological landforms, and existing vegetation, general ecological areas have been delineated. This effort identified six eco-areas: beach ridges and swales, riverine, karst, coastal resources, sand dunes and urban areas. **Figure 2.**6 is a map of the Eco-Areas. The mapping of these areas will lend itself to development of recommended treatments in subsequent chapters. For example, several preferred species to plant on old sand dunes are red oak, serviceberry, beach cherry, and jack pine.

*Beach Ridges and Swales:* This area includes remnant sections of the post glacial beach ridge and swale complex called the Ossineke Beach Ridge, (see above section on geology). Most of the remnant undeveloped areas have high water tables and as a result are less desirable for development. However, both the City and Township have slated these areas for residential development. The old beach ridges are low and tend to support aspen, ash, elm and willow trees. White pine can be found growing on better drained, somewhat higher ridges. Speckled alder willow and red osier dogwood shrubs inhabit.

Many species of wildlife use the lowland forest areas for nesting and feeding. Species such as the northern parula, wood thrush, whip-poor-will, American woodcock, veery, belted kingfisher, eastern harvest mouse, and mink utilize these areas for nesting, feeding and rearing their young. The barred owl, prothonotary warbler, red-headed woodpecker, pileated woodpecker, northern flying squirrel, raccoon, wood duck, and hooded merganser nest in cavities of trees in the lowland forests.

Figure 2.6

General Ecological Areas



Lowland brush types provide resting cover, nesting sites and feeding opportunities for many species of birds, mammals and reptiles. The dense, tangled growth habit also discourages intruders. The rose-breasted grosbeak, black-billed cuckoo and yellow-billed cuckoo, ruffed grouse, woodcock, veery, alder flycatcher, gray catbird, yellow warbler, common yellowthroat, house wren, black-capped chickadee and song sparrow all use lowland brush types. A few species of wildlife that nest under ground or in debris include the northern waterthrush, snowshoe hare, least weasel, star-nosed mole, meadow jumping mouse and wood turtle. The yellow-bellied flycatcher and Wlison's warbler may be seen in spring and fall migrating through the area.

*Riverine:* This area includes the Thunder Bay River, Wildlife Sanctuary, Lake Besser, islands in the river and riparian lands adjacent to the water features. Vegetation in this eco-area ranges from aspen and jack pine on upland well drained sites to willow, and red osier dogwood shrubs on lower sites adjacent to the river and to cattails, bulrushes and lily pads on wet sites. The area includes the Alpena Wildlife and Sportsman's Island Park.

Rivers and riparian forests provide critical habitat for many species of wildlife and reptiles. The riparian zones are long narrow edge habitat, an interface between land and water. The area is part an ecological corridor that extends far inland to Oscoda and Montmorency Counties. A long list of wildlife use this area, including red shouldered hawk, kingfisher, northern oriole, osprey, bald eagle,

red-headed woodpecker, tree swallow, northern harrier, black tern, marsh wren, swamp sparrow, red winged blackbird, green-backed heron, and great blue heron. Waterfowl species may include wood duck, mallard, Canadian geese, hooded merganser American coot, American black duck, and blue winged teal. Deer, raccoon, northern flying squirrel, beaver, muskrat, water vole, mink and river otter also frequent these areas. Gray tree frogs, spring peepers, green frogs, wood frogs, painted turtles, snapping turtle, wood turtles, eastern ribbon snakes, water snakes, salamanders and central newts can all be found in river/flood plain areas. Birds such as the Caspian tern, common tern, Foster's tern, common snipe, lesser scaup, may stop over in these areas on the annual north-south migration along the coastal areas.

*Karst:* The northern part of the planning area is influenced by the presence of limestone bedrock at or near the surface. Northern white cedar thrives on these shallow soil and is the dominant forest species in both wet and dryer areas. Black spruce, white spruce, balsam fir, eastern tamarack, aspen, white birch, white pine, jack pine, and red pine can be found growing in the forested areas. Shrubs such as hawthorn, autumn olive, tartarian honeysuckle, spreading junipers can be found on dryer sites, while, speckled alder, willow, and red osier dogwood shrubs dominate wetter areas. There are also numerous open areas in the karst eco-area which consist of old farm fields, wet meadows and cleared areas. The karst eco-area has extensive areas of undeveloped

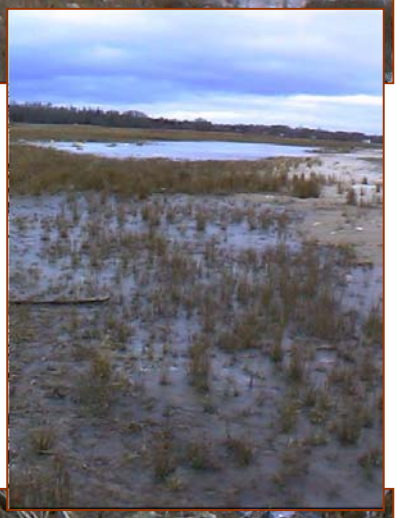
lands, partially due to large ownership, limited development potential and the underlying bedrock resources.

Conifer forests provide important winter thermal cover for many wildlife species. There tends to be less snow on the ground, more protection from the cold winds and often a higher nighttime temperature than other cover types. The snowy owl, pine grosbeak, purple finch, boreal chickadee, and black-capped chickadee frequent lowland conifer stands during the winter months. Many species of wildlife Northern saw-whet owl, black-backed woodpecker, short-eared owl, northern parula, northern waterthrush, solitary vireo common snipe, arctic shrew, meadow vole, snowshoe hare, and white-tailed deer use the lowland conifer forest for nesting and feeding. This cover type also offers opportunities for viewing migratory birds in the spring and fall. These species include the olive-sided flycatcher, golden-crowned kinglet, ruby-crowned kinglet, Swainson's thrush, Tennessee warbler, winter wren, palm warbler, Connecticut warbler, Lincoln's sparrow and white-tailed sparrow.

Old farm fields and natural forest openings are most prevalent in the karst eco-area. Forest openings serve an important function in the spring; because they are in the sun most of the day, openings are the first area to loose snow and to green up. After a winter of eating twigs and seeds, animals seek out openings for a meal of succulent nourishing fresh greens. Predators, like the red-tailed hawk and fox, understand this fact and cruise these areas for a spring meal of rodents. Flowering plants throughout the growing season attract insects, which in turn are devoured by birds. Some of the birds found in openings are the red-tailed hawk, eastern kingbird, American kestrel, eastern bluebird, common nighthawk, killdeer, upland sandpiper, horned lark, vesper sparrow, Savannah sparrow, grasshopper sparrow, bobolink, eastern meadowlark and eastern screech-owl.

Other wildlife frequenting openings are the eastern cottontail, white tailed deer, shrews, woodchuck, ground squirrel, field mice, red fox, voles, and badgers along with the eastern hognose snake, smooth green snake and milk snake.

*Coastal Resources:* The coastal wetlands in Whitefish Bay, Squaw Bay and around Bare Point and Partridge Point are remnant examples of the extensive wetlands that ringed Thunder Bay during pre-settlement times. The mouth of the Thunder Bay River was a rich delta consisting of emergent wetlands, marshes, wetland forests, sandy beaches and oak and pine forest covered beach ridges. It was an area where great numbers and types of wildlife and fish congregated. Native American people understood and exploited the abundant plant, animal, and fish resources. The junction of a major river and Great Lakes was also the best place to locate a town. When water transportation was the primary mode, the Thunder Bay River brought raw materials to the community, to be processed into goods, loaded on the sailing ships and steamers, then transported to markets in large cities around the Great Lakes. To allow for the construction of large factories, land was cleared, low areas filled and the river tamed. One hundred years of activity eliminated the coastal marshes from Lafarge Corporation down to Michekewis Park.



With lower lake levels of Lake Huron, coastal marshes along Stony Point, Bare Point and Whitefish Bay have temporarily expanded. Between Stony and Bare Points wave action is creating new beach ridges. The landward side of the beach ridges drops off, creating a protected emergent wetland. The is a living example of the process that happened 1000's of years ago further inland when the beach ridge and swale complexes were created. Birds such as sandpipers, terns, plovers, snipes and gulls all frequent these coastal wetlands and beaches. Great blue herons, marsh wrens, red-winged blackbirds, swamp sparrows, mallard and black ducks can be found in the marshes. Plants include, cattails, sandbar willow, bulrushes, sedges, joe-pie-weed, jewelweed, arrowhead, and water plantain.

*Sand Dunes:* The wide beach ridge or sand dune, located approximately one mile inland from the lakeshore, is designated as its own ecological feature. The pine-oak forest is the predominant forest type growing these sandy ridges. This forest type is not common in other parts of the study area. Remnant forests of red oak are found in subdivision adjacent to Hobbs Drive, Autumn Drive, Grant Street, Piper Road, Greenhaven Lane and Shelley Street in the southwest corner of the study area. Natural stands of jack pine and white pine trees can be found adjacent to the Alpena Area High School, Evergreen Cemetery, and Thunder Bay Recreation Center. Other plants include sedges, grasses, blueberries, spreading junipers, serviceberry, and chokecherry. Most of this ecological feature has been developed for institutional or residential uses.

Oak forests provide food in the form of acorns and leaf buds along with limited browse. Whip-poor-will, gray jay, red-eyed vireo, scarlet tanager, downy wood pecker, pileated

woodpecker, blue jay, white-breasted nuthatch are a few birds that inhabit oak forests. Wild turkeys, gray squirrels, fox squirrels, and white-tailed deer are typical game species found in the northern oak forests. The gray jay, pine grosbeak, evening grosbeak, red crossbill, purple finch, boreal chickadee, and pine siskin frequent upland conifer stands during the winter months. The solitary vireo, red crossbill, black-throated green warbler and evening grosbeak nest in the canopy of pine trees. Pine forests also offer opportunities for viewing migratory birds in the spring and fall. These species may include the golden-crowned kinglet, ruby-crowned kinglet, Swainson's thrush, blackburnian warbler, magnolia warbler, bay-breasted warbler, Canada warbler, hermit thrush and winter wren.

Urban Areas: Typical of most older cities, small natural pockets of land are very limited in residential and commercial developments. Active and abandoned railroad ROW's, parks, cemeteries, creeks and drainageways provide critical corridors. Connected backyards in the internal portions of city blocks may also function as habitat for certain species of song birds.

**Key Ecological Corridors**

The key ecological corridors are Thunder Bay River, Wildlife Sanctuary, Lake Besser, Norwegian Creek, Fletcher Creek, and several manmade drainage networks. The shoreline and emergent wetlands along the Lake Huron Shoreline are another important, yet very limited corridor. Other important corridors are the Lake States Railroad, that enters the community from the southwest, and the Paxton Spur Rail-Trail that enters the community from the west near the Alpena High School. Though the Lake States Railroad row passes through the community, connecting to Lafarge at the north end, the ecological integrity is greatly compromised in commercial areas.

## Parks, Public and Institutional Lands

Parks represent lands that have been dedicated for open space public uses. These include ball fields, swimming beaches, nature areas and picnic areas. Being these are publicly owned lands; there is a greater potential for enhancing ecological features within the community. Public and institutional lands, while not dedicated necessarily dedicated to open space or recreational uses, may have greater potential for completing projects that will improve wildlife habitat and protect other resources. This category includes schools; fairgrounds; churches; hospitals; golf courses; cemeteries; and local, state and federal buildings with surrounding grounds. The City of Alpena Master Plan and the Alpena Township Master Plan were used to identify parks, public and institutional lands. **Figure 2.7** shows the location of parks, public and institutional lands.

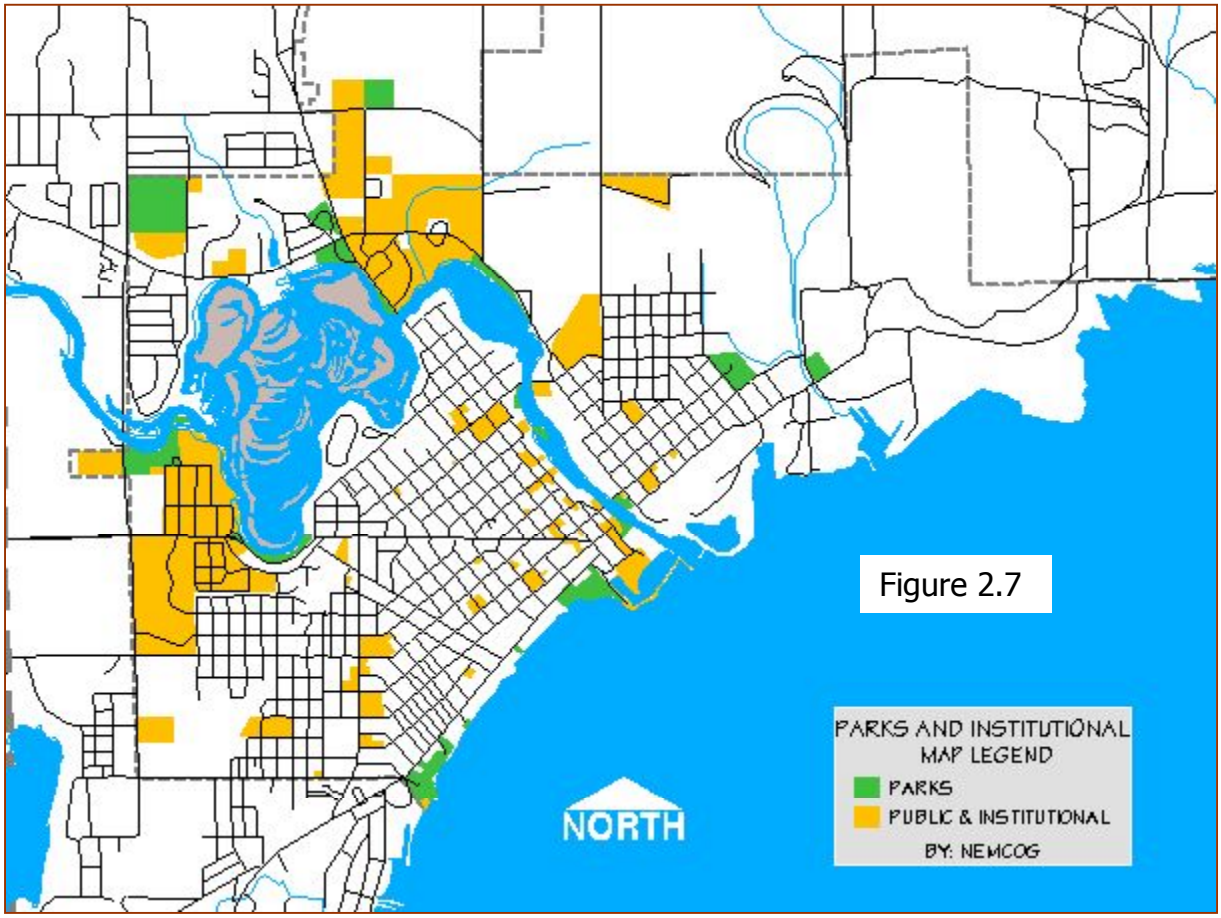



Figure 2.7

# Chapter 3 – Eco-Planning Goals

The purpose of this chapter is to set forth goals to guide the establishment of a proactive community-wide resource program. A program that will focus on ecological corridors within the community, protect our natural heritage and bring nature into the city. The basis of this program is to use the four pronged approach of regulation, acquisition, education and technical assistance. Previous chapters of this plan provided information on the natural history of the Alpena area. Once a site of high biological diversity, development over the last 150 years has converted many forests and wetlands to urban uses. The plan identifies remaining natural features and describes general ecological areas. Before proceeding it is important to address the following question.

**Why protect nature in our community?**

1. Natural areas enhance the quality of life for residents and help define community identity by connecting residents to the natural landscape.
2. Healthy, functioning natural areas provide recreational opportunities including hiking, fishing, bird watching, and nature study.
3. Natural landscapes soften the hard edge of urban built-up areas with the greenery of leaves, the many colors of flowers and fruits, the smell of blossoms and the sounds of birds.
4. Parks and open space enhance the economic value of the area. Open lands cost less in services than other uses, and add to the value of properties nearby.
5. Natural landscapes have many environmental benefits- they control erosion, help retain stormwater, help clean the air of pollutants, help protect surface water quality, mitigate global warming by absorbing carbon dioxide and other greenhouse gases, and help shelter and cool our homes. All of these services are provided absolutely free.
6. Future generations will enjoy the legacy of today's efforts to protect our natural heritage.
7. Spiritual Values – "A sense of place, a sense of well being, a quiet place to look inward, feeling at one with the earth," there are many ways people express the spiritual values associated with spending time in natural areas.

## Overall Ecological Goal

*Protect the community's valuable resources from impacts of development so that people and natural systems can coexist. To this end, implement a proactive community-wide resource management program based on principles of ecosystem management, whereby all of the community's natural systems are protected and managed.*

"Ecosystem refers to the relationship between a community of plants and animals and its living and non-living environment. This relationship includes the rain, sun, wind and elements of the atmosphere; the plants and animals, including people, on the land and in the waters; and the soil, geology and water

that occurs on or in the land. Interacting together, these diverse environmental factors form an ecosystem." Ecosystem management considers all components and the interrelationships of those components; and that altering one component will affect the entire ecosystem. For example, the destruction of wetlands will in turn negatively impact water quality.

## Community-Wide Resource Goals

Collaborative Actions

*Use a collaborative approach to protecting and managing natural systems by forming partnerships with local and state agencies, adjacent units of governments, and resource organizations.*

*Support the community-wide Eco-Plan program with a combination of funding sources including grants, foundations and the communities' general fund.*

*Continue to develop the City's and County's Geographic Information System (GIS) programs for use in community planning, community development, and natural resource management. Work towards developing data sharing agreements and establish protocol to exchange GIS data.*

The City of Alpena and Township of Alpena does not have specialized resource staff to establish and implement natural resource planning and management programs, nor are there the financial resources to carryout all of the prescribed resource management activities. There are local, state and federal agencies, as well as numerous organizations whose missions are to protect and manage natural resources. Though not a comprehensive listing, several of those entities are the Alpena County Conservation District, Alpena County MSU Extension, Alpena Sportsman's Club, Wildlife Sanctuary Committee, Local Garden Clubs, Nature Conservancy, Headwaters Land Conservancy, Thunder Bay River Watershed Council, Northeast Michigan Council of Governments, Huron Pines RC&D Council, Michigan Department of Environmental Quality, Michigan Department of Natural Resources, Natural Resource Conservation Service, and U.S. Fisheries and Wildlife Service. These groups have staff, volunteers, and/or grant dollars available to work with communities on resource management.

There are great benefits to communities working together. Watersheds, streams, ecological corridors and wildlife have a complete disregard for political boundaries. The interconnected web of life, the" green infrastructure" was established long before the land area was divided into political units. Without question, the actions of one community can have a direct impact on the resources in an adjacent community. Therefore, it is imperative that adjacent communities coordinate land use planning and development activities. Working together to protect critical area-wide resources and to

improve and re-establish degraded ecological corridors is a win-win scenario for all communities.

## Comprehensive Land Use Planning

*Incorporate resource planning into the community's land use planning process.*

A comprehensive land use plan or master plan is a community's primary tool for guiding future development. The plan is often referred to as the legal foundation for zoning. Therefore, it is the key local document to plan for resource protection. The comprehensive land use plan should identify critical natural areas such as wetlands, stream corridors, floodplains, ecological corridors, and threatened and endangered species and plant communities. The land use plan should embrace environmental and ecological principals. For example, require quality of design that relates to the natural environment of the site, streetscape and landscape; and future land use types and development densities that are based on resource constraints and the carrying capacity of the land. The plan should have policy statements that encourage the preservation of open space and management of the community's green infrastructure. Since natural ecosystems extend far beyond the individual community's boundaries, the plan should coordinate with surrounding communities.

## Resource Friendly Zoning

*Implement the resource goals and recommendations identified in this plan and the community land use plan through the zoning ordinance.*

While comprehensive planning functions as a guide by identifying goals and policies, local zoning is the primary tool communities can use to encourage the use of lands in accordance with their character and adaptability, to limit the improper use of land and to conserve natural resources and energy. This plan recommends using performance zoning; density restrictions; setbacks, buffers and open space requirements; special districts and overlay zones; and cluster development/conservation development to protect identified critical natural areas.

## Stormwater Management

*Adopt area-wide stormwater management ordinances to regulate the conveyance, containment and treatment of stormwater run-off.*

Conventional urban development dramatically increases the quantity of stormwater run-off and degrades the quality of run-off as compared to natural landscapes. Impervious surfaces such as streets, parking lots and buildings increases run-off quantities. Ditches,

concrete lined drainageways and storm sewers speed up the removal of stormwater from urbanized areas, but do nothing to treat the run-off. When wetlands and natural drainageways are filled during development, communities need to build larger, more costly stormwater conveyance systems, often at the taxpayers' expense.

A more coordinated and proactive approach to stormwater management first focuses on preserving the green infrastructure - wetlands, natural drainageways, forests and meadows. Next, when development occurs, design standards are used to reduce the amount of impervious surface area, thereby reducing runoff quantities; and to create a landscape that filters and absorbs runoff before it leaves the site. Techniques may include construction of natural wetland detention basins and use of conservation cluster residential development. Along with reducing infrastructure costs, the reliance on a green infrastructure system will preserve and sometimes create important wildlife habitat.

## Lake, Stream and Wetland Protection

*Adopt zoning and development design standards to supplement State and Federal laws pertaining to wetlands and water quality protection.*

While there are a number of State and Federal laws designed to protect water quality and wetlands, the first line of responsibility falls to local communities. This is most evident in the area of non-point source pollution where increased runoff from urbanizing landscapes degrades surface water quality and negatively impacts wetlands. Local ordinances should prohibit damaging modifications to natural drainages and wetlands, require mitigation for unavoidable disturbances, protect natural buffers along waterbodies and wetlands, require adequate setbacks for buildings and pavement, and prohibit direct discharge of untreated stormwater into surface water and wetlands.

## Riparian Forests and Wetlands

*Work cooperatively with local, regional and state agencies to restore and protect natural buffers along the edges of streams, lakes and wetlands.*

Resource managers have long understood that naturally vegetated buffer strips play an important role in protecting the health and quality of surface water and wetlands. Removal of natural vegetation, planting of turf grass and placement of rock rip-rap not only destroys critical wildlife habitat, but has a long term negative impact on water quality. Buffers enhance fish and wildlife habitat, filter pollutants from runoff, stabilize shorelines, provide a visual and noise screen, shade and cool water, and enhance aesthetics. Buffers should range from 25 to 100 feet depending upon the wetland and water feature. The community should partner with agencies and organizations to secure funding for accomplishing restoration projects.

*Amend local zoning regulations to protect existing natural buffers along streams, lakes and wetlands.*

The best means to protect existing natural buffers during land development is through the local zoning ordinance. Zoning ordinances that encourage conservation cluster development and that require greenbelts will maximize the benefits of riparian forestlands. Greenbelt regulations should designate a minimum 50' water quality buffer of trees, shrubs and herbaceous vegetation. Regulations should include standards for establishing multi-layered vegetation (trees, shrubs and herbaceous), including spacing, density, and preferred species.

Natural Landscaping

*Work towards the use of natural landscaping, where appropriate, in community parks, around public facilities, and on private lands.*

*Encourage the use of native plants for reforestation, wildlife habitat, street and neighborhood trees, landscaping, parks and roadside corridors.*

*Discourage the use of invasive, harmful and problem prone plants, such as autumn olive, multiflora rose, reed canary grass, purple loosestrife, boxelder, and Siberian elm.*

Pre-settlement vegetation types prior to the 1800's consisted of pine, oak and cedar woodlands, brush and forested wetlands, open meadows, upland brush, and marshes. Within the urbanized landscape, well-manicured, turf grass lawns with occasional lollypop shaped ornamental shade trees have mostly replaced these natural landscapes. These urbanized landscapes are grossly lacking in biodiversity and wildlife habitat.

Design standards and zoning requirements should be used to protect existing native trees and other native vegetation along with setting aside open space when lands are developed. Through use of incentives, technical assistance and educational programs homeowners, institutions and businesses should be encouraged to re-establish natural areas by planting native flowers, grasses, shrubs and trees. Communities should establish wildlife pocket plantings within parks and adjacent to public facilities. The plantings could be as simple as a couple of conifer trees surrounded by several fruit and nut bearing shrubs and trees. The appendices of this plan contains listings of recommended native plants and invasive/problem prone plants compiled by the Michigan Association of Conservation Districts and MSU Extension.

Street Trees and Neighborhood Forests

*In recognizing the importance of trees in the suburban and urban environment, encourage the retention of existing native trees and the establishment of street and shade trees in residential neighborhoods and commercial developments within the Community.*

Research has proven a healthy fabric of shade and street trees provides numerous benefits. Urban forests reduce stormwater runoff by capturing precipitation; provide wildlife habitat; reduce energy consumption; increase property values; and create a more livable community. In older developed areas, communities can establish a street tree program to maintain existing trees and plant new trees when older trees are removed. Individual homeowners can further improve the environment by planting shade trees, wildlife shrubs, flowers and grasses. This plan recommends communities implement "Yard-Link," a cooperative neighborhood-wide backyard planting program designed to create interconnected wildlife habitat areas and re-establish fragmented wildlife corridors.

When development occurs on "green sites," communities can use the site plan review process to minimize the loss of existing native trees and shrubs. The process can be used to encourage the planting of shrubs and trees where needed, provide suitable areas for planting trees, minimize conflicts with utility and transportation systems, and incorporate aesthetics considerations to protect views along roads and streets.

Open Space Preservation

*Identify non-protected areas within the community that present opportunities for protection, prioritize those areas to maximize biodiversity and community benefits, preserve priority areas using all available resources and techniques.*

Preserving open space within an urban landscape will make neighborhoods more livable. A national survey found the three most desirable amenities for residential areas were open space, walking and bicycle paths, and gardens with native plants. Communities with the greatest success at preserving open space use a multitude of approaches. The common approaches are dedication/donation of lands, purchase of development rights, fee simple purchase, conservation easements, voluntary conservation and land trades.

## Ecological Corridors

*Encourage the preservation, enhancement and restoration of critical wildlife habitat and important ecological corridors.*

Some of the best opportunities and clearly the least costly means of protecting and improving the ecological resources are through voluntary conservation. This plan encourages communities to work with local, state and federal agencies and organizations to develop a landowner technical assistance program that targets parcels within key ecological corridors. Particular attention should be given to areas under pressure for development and areas where the integrity of the corridor has been compromised by development.

Railroad right-of-ways and Rail-Trail corridors present excellent opportunities for creating ecological corridors. Often, the simple act of planting trees and shrubs will greatly boost the resource benefits of the transportation corridor. Another advantage of working along these corridors is the single ownership of either Lake States Railroad or Michigan Department of Natural Resources.

The zoning ordinance can be used to preserve critical areas through open space conservation development, cluster residential development, dedication/donation of lands, and purchase of development rights. During the site plan review process, communities are able to work towards protection of primary and secondary conservation areas, including critical wildlife habitat, steep slopes, ridgelines, wetlands, lowland forests, old growth forestlands, and natural meadows.

## Education and Public Awareness

*Increase public awareness and encourage residents and businesses to participate in the implementation of the community-wide Eco-Plan through educational programs and community events such as National Arbor Day and Earth Day.*

Landowners (residential, commercial and institutional) will play a key role in maintaining the ecological resources of the community. In order for the Alpena Eco-Plan to reach full maturity, a strong education and public awareness program needs to be implemented. At the present time, the City does not have an environmental educator on staff, nor is it a consideration in the near future to hire such staff. However, this education goal can be achieved by working cooperatively with agencies and organizations such as MSU Extension, Jesse Besser Museum, Community Foundation for Northeast Michigan, Alpena Conservation District, Wildlife Sanctuary Committee, Thunder Bay Watershed Council, Michigan DEQ, local schools and Northeast Michigan Council of Governments.

The Eco-Education Program should include workshops, newsletters, direct mailings and web sites to disseminate information. There are many state and federal agencies; organizations and foundations that have grant programs designed to support natural resource education efforts. Of course, a technical assistance program must follow a successful education program. In other words, once people are motivated to take action, technical assistance should be available to make sure activities are properly carried out.

## Technical Assistance

*Promote a healthy and diverse natural environment by developing a technical assistance program with the assistance of agencies, organizations, associations and resource professionals.*

Much of the Eco-Planning area is in private ownership. In conjunction with the above education and public awareness effort, the community needs to establish a technical assistance program. Landowners planning to implement recommended activities will need to access technical assistance. The City of Alpena and Township of Alpena do not have the specialized resource staff to provide this assistance. They do not intend to hire such staff in the near future. However, there are local, state and federal agencies, as well as numerous organizations whose missions are to protect and management natural resources. These groups have staff, volunteers, and/or grant dollars available to work with communities on resource management. The City and Township have the ability to tap into grant dollars, which can in turn be used by organizations to provide the needed technical assistance.

# Chapter 4 – Eco-Planning Areas

## Introduction

The next step in this planning process is to designate Future Eco-Planning Areas. Much like a future land use plan of a community's master plan, this chapter will identify future ecological planning areas and recommend actions such as planting, protection and restoration. Areas within the community with common features, such as open space, forest lands, urban built-up, coastal wetlands, and riparian zones have been grouped into ecological planning areas. It is also recognized that while the community has been divided into Eco-Planning Areas, certain natural systems function across area boundaries and even across political boundaries.

Based on community goals established in Chapter 3, recommendations and approaches to managing resources within these unique zones have been developed. Local regulations, acquisition, education and technical assistance form the comprehensive approach to the community-wide resource program. It is important to note, this community-wide Eco-Plan is intended to support the communities' Master Plan, by providing further guidance on protecting and managing the natural resources. If a conflict arises between information presented in the Eco-plan and the master plan, the master plan would prevail.

## Eco-Planning Areas

Listed below are the five different resource planning areas used to develop the future Eco-planning recommendations. Detailed explanations of each Eco-Planning Area will follow. **Figure 4.1,** the Eco-Planning Area Map, can be found at the end of the chapter.

- Open Space Preservation
- Backyard Conservation
- Riparian Corridors
- Coastal Wetlands
- Rail-Trail and Railroad Corridors

### Open Space Preservation

The open space preservation Eco-planning area covers the largest land area. The rural-urban interface rings the developed portions of the community and is under the greatest pressure for conversion to urbanized uses. Constraints such as hydric soils and bedrock have thus far limited the intensity of development.

The open space preservation includes the extensive karst ecological type north of the Thunder Bay River and the beach ridge and swale complexes in the southern portions of the planning area. Quarry operations and processing facilities as well as residential and limited industrial development are included. As detailed in Chapter 2, cover types range from: upland forests of pine, aspen-birch, red maple and red oak, to lowland forests of northern white cedar, tamarack, black spruce, balsam fir, elm, red maple, willow, black ash, balsam poplar and aspen. Shrubs such as hawthorn, chokecherry, pin cherry, and spreading juniper, as well as invasive plants like autumn olive and Tartarian honeysuckle, can be found growing in upland areas. Speckled alder, highbush cranberry, willow, and red osier dogwood shrubs dominate wetter areas. Old farm fields, wet meadows and open marshes can also be found in this Eco-planning area.

Recommended Actions:

- *Local Regulations* - Local zoning is the primary tool communities can use to encourage the use of lands in accordance with their character and adaptability, to limit the improper use of land and to conserve natural resources and energy. Recent amendments to the zoning enabling acts in Michigan mandate that Alpena Township and the City of Alpena to allow clustering of development in residential zoning districts. The clustering option requires a minimum of 50 percent of the land area in a new development be preserved under township and county zoning ordinances and 20 percent in city and village open space ordinances.

  This plan recommends the Township and City use a conservation based cluster residential development approach. When designing conservation-based cluster developments, natural features, scenic features, meadows, wetlands and mature forests should be set aside and protected. "Conservation Design for Subdivision, A Practical Guide to Creating Open Space Networks" by Randall Arendt uses the approach of identifying primary and secondary conservation that should be preserved in developments. A summary of the conservation design approach can be found in the appendix.

- *Detention basins* - New developments should be required to detain run-off on site with discharges not exceeding predevelopment quantities. Detention basins should be designed as constructed wetlands that will detain and clean runoff while also providing wildlife habitat. Properly designed, they will complement the development, provide wildlife habitat and protect water quality. A Michigan Department of Environmental Quality's report titled, "Constructed Wetland Use in Nonpoint Source Control," provides several design examples.

- *Land Reclamation* - Quarry and sand/gravel mining operations are included in the open space preservation future planning area. Once the mineral resources have been depleted and operations abandoned, these sites have the potential of

providing a mix of wildlife habitats. This plan recommends communities and industries work together to reclaim these quarry sites.

- *Purchase/Conservation Easements* - Communities should work in conjunction with land conservancies and conservation organizations to preserve critical areas. Communities should use a combination of funding sources such as grants, local fund raising and general fund allocations to purchase and preserve important conservation lands. Another approach is to encourage landowners to use conservation easements to preserve critical conservation lands.

- *Voluntary Conservation* - In addition to fee simple purchase and conservation easements, important areas can be preserved through voluntary conservation planning with private landowners. Through the Coastal Zone Management Program, NEMCOG developed model resource stewardship plans for private landowners in rural Alcona and Alpena Counties. The Alpena Conservation District and the Natural Resource Conservation Service have a long history of working with landowners. The Eco-Plan recommends that communities work cooperatively with agencies to secure funding and to provide technical assistance to landowners. The approach is to first identify key landowners, next send a direct mailing to offer technical assistance and finally develop resource stewardship plan for interested landowners in this Eco-planning area.

## Backyard Conservation

The backyard conservation Eco-planning area includes residential, commercial, industrial and institutional land use areas. Lots range from less than 1/8 acre to over 20 acres in size. Typical of older cities, small natural pockets of land are very limited in residential and commercial developments. In fact, the natural landscape is highly fragmented due to past development. Parks and institutional properties will function as anchor points. The points should be linked with green corridors such as tree-lined boulevards; vegetated pathways and networks of connected backyard wildlife habitats.

- *Yard-Link* – This plan recommends establishing a neighborhood based backyard conservation program that will strive to improve urban wildlife habitat. One yard at a time, block by block, and neighborhood by neighborhood the planting of shrubs, trees, wildflowers and grasses will provide two of the essential elements

of wildlife habitat, food and shelter/cover. Along with natural water sources, bird baths and backyard water gardens can provide a third element, water.

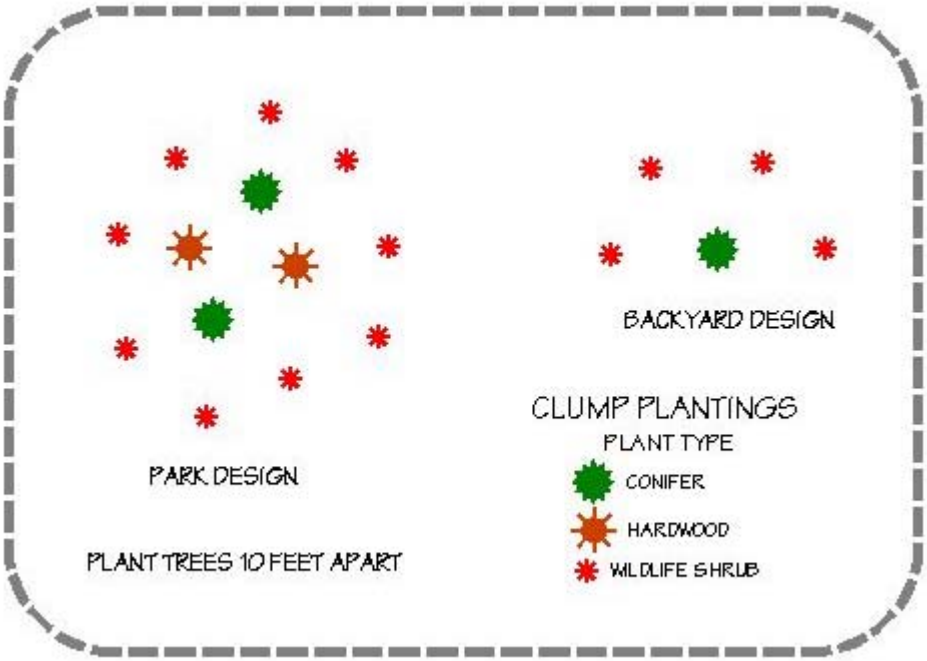
The community can offer planting packets with one hardwood, one conifer and four fruit and nut bearing wildlife shrubs to homeowners. If purchased through the Conservation District, cost would be approximately $5.00 per packet. This program should target one neighborhood at a time versus a citywide blanket approach.

There are larger tracts of institutional, industrial and commercial land uses such as the college, hospital, and schools as well as city parks. These sites present excellent opportunities for improving wildlife habitat. Patch plantings of 10 or more shrubs and trees or linear plantings of mixed shrubs and trees will expand the green network.

Technical assistance and community education programs are key components of a comprehensive community resource program. This plan recommends working cooperatively with the Alpena Conservation District, Alpena County MSU Extension, and NEMCOG to implement the Yard-Link program. An education program should be used to inform landowners of the benefits of backyard conservation. The program would also provide technical assistance to landowners. The communities should seek grant funding from federal and state agencies to share in the costs of Yard-Link education, technical assistance and planting programs.

- *Detention basins* – The Fletcher Creek Flood Study recommends construction of detention basins to mitigate excessive stormwater runoff. Detention basins should be designed as constructed wetlands that will detain and filter runoff along with providing wildlife habitat. Properly designed they will complement the development, provide wildlife habitat and protect water quality. A

Michigan Department of Environmental Quality's report titled, "Constructed Wetland Use in Nonpoint Source Control," provides several design examples.




- *Natural Landscaping* – When selecting planting stock, the use of native plant is recommended. The Michigan Association of Conservation Districts has compiled lists of native plants. These lists are included in the appendix of this plan.

- *Buffers* – Most zoning ordinances require landscaping and screening between different land uses. Typically, the plant list consists of ornamental varieties of shrubs and trees, which are pretty, but offer little wildlife value. This plan recommends communities amending ordinances to include native plants that beautify the site along with providing food and shelter for wildlife.

- *Urban Forests* – Healthy urban forests of street trees and yard trees are beneficial in many ways. This plan encourages landowners to plant and maintain shade trees around their homes and businesses. The community is encouraged to develop street tree programs that manages existing trees, replant when trees are removed and plant trees in neighborhoods lacking in streets trees. A comprehensive inventory should be conducted to locate and identify tree species,

tree condition and tree health. Next, a street tree management plan should be developed and implemented.

## Riparian Corridors

Riparian forests are forestlands adjacent to lakes, streams, creeks and drainageways. Natural riparian forest areas tend to have a multi-layered canopy with mature trees, young trees, shrubs and herbaceous ground cover. Natural, undeveloped shoreline habitat is one of the most endangered habitats in Michigan. There is a continuing trend for lake lot owners to clear brush, aquatic weeds, dead trees and live trees that interfere with a wide-open view of the water. The native vegetation is replaced with well-manicured and chemically treated lawns down to the water's edge. This practice not only degrades critical wildlife habitat but also impacts water quality by diminishing the riparian zone's capacity to filter nutrients and ability to stabilize shoreline erosion.

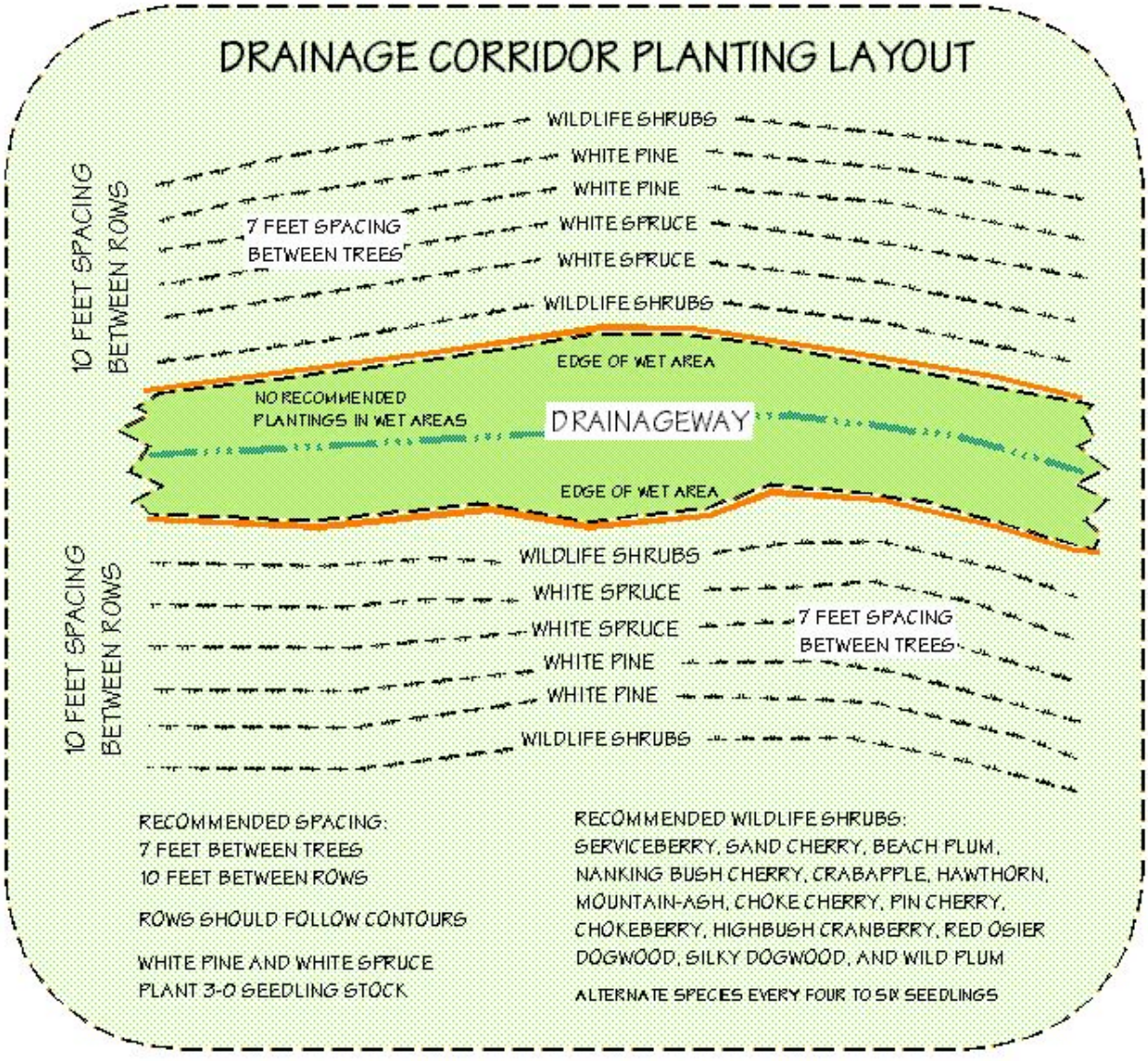
The Riparian Corridor is defined as a 200 feet zone of influence either side of streams, creeks and drainageways; and along the shores of lakes and impoundments. Upland forests, lowland forests, swamps and marshes are included in this Eco-planning area. Ownership types are public and private. This plan recognizes the importance of forest riparian zones for wildlife habitat, water quality protection and aesthetics.

- The maintenance and re-establishment of greenbelts along lakes, streams, creeks and drainageways is encouraged as is the use of native ground covers, shrubs and trees. Lakescaping by Carroll Henderson, Minnesota Department of Natural Resources, presents guidelines and lakeshore landscaping schemes that are water quality friendly. The Thunder Bay Watershed Council has a brochure called "Landscaping to Protect River and Lake" that provides information on greenbelts and lists of native plants. The Arthur E. Sytek Park, located on the Thunder Bay River south of the Bagley Street Bridge, has been developed as a demonstration site to show riparian plantings and use of native plants. Lists of native plants recommended for use in greenbelts can be found in the appendix.

- The Thunder Bay River and Wildlife Sanctuary are high quality ecological corridors. Few communities in Michigan are blessed with such natural assets within their city limits. Continued support of the Wildlife Sanctuary and Thunder Bay River watershed initiative is recommended. Shrub and tree plantings along the shoreline of Lake Besser, Lower Thunder Bay River and Wildlife Sanctuary will improve riparian functions. Recommended species are crabapple, hawthorn, chokeberry, serviceberry, sand cherry, beach plum, cherry, beaked hazelnut, American hazelnut, wild plum, highbush cranberry, red osier dogwood, and silky dogwood. Bittersweet, Virginia creeper, and wild grape are vines that produce fruit cherished by wildlife along with adding to the visual quality of the plantings.

- Local zoning is the primary tool communities can use to encourage the use of lands in accordance with their character and adaptability, to limit the improper use of land and to conserve natural resources and energy. Amending zoning ordinances to allow for conservation cluster residential development and strengthening greenbelt regulations will maximize the benefits of riparian zones.

- Stormwater management practices in new developments should be designed to limit direct discharge of run-off into all water bodies.




- Technical assistance and community education programs are key components of a comprehensive community resource program. In a concerted effort to restore riparian forests, the community, in cooperation with conservation organizations, and local, state and federal agencies, should develop and implement technical

assistance and education programs targeting riparian property owners. The community should apply for state grants and foundation grants to fund the technical assistance and education programs. Suggested activities include developing lakeshore demonstration sites based on principles in Lakescaping by Carroll Henderson.

- The Community should consider a cost sharing program to encourage planting native ground cover, shrubs and trees in degraded riparian zones and within 50 feet of all shorelines.

## Coastal Wetlands

Remnants of once extensive coastal wetlands remain between Bare Point and Mich-e-ke-wis Park and along Whitefish Bay. The extent (width from land to open water) of the emergent wetlands varies depending upon the fluctuating Lake Huron levels. For a multitude of reasons these priceless wetlands should be protected.

Recommended Actions:

- Protect and preserve through supporting local, state and federal regulations.
- Utilize constructed detention wetlands to treat stormwater runoff prior to discharge into these wetlands.

## Rail-Trail and Railroad Corridors

The Paxton Spur Rail-Trail, Lake States Railroad and proposed Hawks Rail-Trail are denoted as red lines on the Eco-Planning Area map. Clearly these corridors present excellent opportunities to create ecological corridors that will bring nature into the city. The long narrow corridors pierce the city center from three directions. Another advantage of working along these corridors is the single ownership of either Lake States Railroad or Michigan Department of Natural Resources. Presently the corridors have a single purpose of transportation whether recreational or movement of goods. Planting of trees, shrubs, wildflowers and native grasses will both improve the visual quality and enhance the ecological integrity.

- This plan recommends establishing an ecological pathways program. One of the first steps will to meet with the Michigan Department of Natural Resources and the Lake States Railroad to discuss the ecological potential of the corridors. The intention is to define planting guidelines and seek preliminary approval for the landscape enhancement activities. After planting plans are drawn up, another meeting with each entity would present the design and seek final approval.

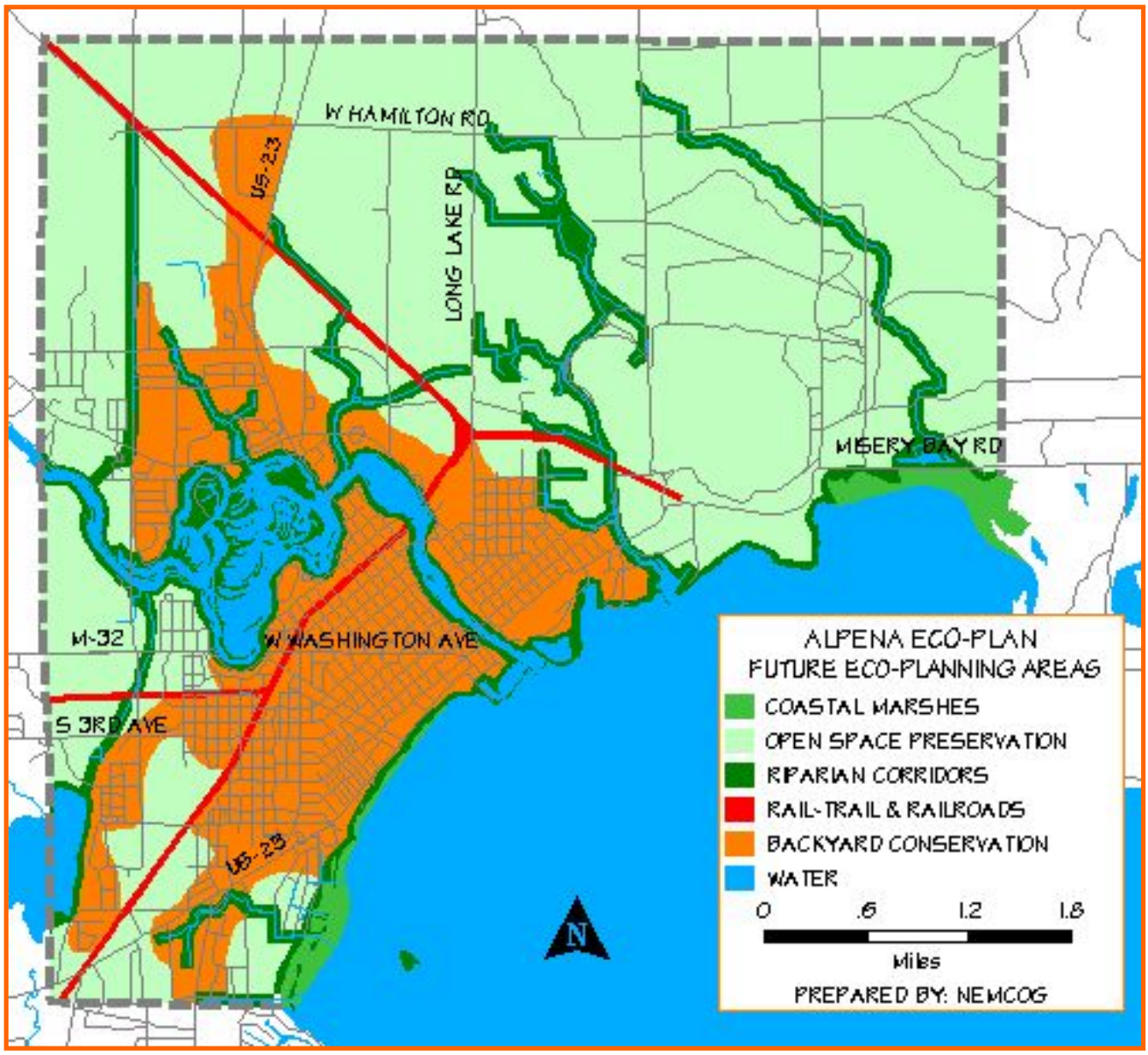
- Vegetation should be planted along the outside edge of the right-of-way. Generally, trees should not be planted in solid rows; instead linear groupings of 5 to 10 trees would be more desirable. A mixture of conifer and hardwood trees could include, white pine, red pine, white spruce, northern white cedar, sugar maple, red maple, American beech, red oak, white oak, and green ash. A more complete list of species can be found in the appendix.

- Planting fruit and nut bearing shrubs and trees adjacent to the tree plantings can further enhance wildlife values. Recommended species are crabapple, hawthorn, chokeberry, serviceberry, sand cherry, beach plum, pin cherry, beaked hazelnut, American hazelnut, wild plum, highbush cranberry, red osier dogwood, and silky dogwood. Bittersweet, Virginia creeper, and wild grape are vines that produce fruit cherished by wildlife along with adding to the visual quality of the plantings.

- Planting grasses and wildflowers along the outer edge of the right-of-ways will further improve wildlife habitat and improve the visual quality of the transportation corridors.

- *Adjacent Landowners* – The ecological benefits of these corridors can be expanded by encouraging adjacent landowners to plant shrubs and trees. Using the same approach as the Yard-Link, landowners are targeted with education programs and provided technical assistance for planting seedlings.

- In order to reduce the costs associated purchasing planting stock; it is recommended to use bare root seedling stock where ever feasible. Other than staking to identify their location in high use areas, little follow-up attention is required. Literally hundreds can be purchased for the cost of one large balled and burlap tree specimen. The Alpena County Conservation District sponsors an annual shrub and tree seedling sale. Planting stock can be purchased through the Conservation District or directly from seedling nurseries around the state.


W HAMILTON RD
US-23
LONG LAKE RD
MISERY BAY RD
M-32
W WASHINGTON AVE
S 3RD AVE
US-23
ALPENA ECO-PLAN
FUTURE ECO-PLANNING AREAS
COASTAL MARSHES
OPEN SPACE PRESERVATION
RIPARIAN CORRIDORS
RAIL-TRAIL & RAILROADS
BACKYARD CONSERVATION
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.6
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PREPARED BY: NEMCOG
N

## Brief Summary of "Conservation Design for Subdivision, A Practical Guide to Creating Open Space Networks" by Randall Arendt

*50% of buildable land may be conserved on any development by grouping new development in a more compact, efficient and neighborly manner without reducing overall density or profitably.*

### Identifying open space areas to protect.

Primary Conservation Areas
1) Unbuidable wetlands
2) Water bodies
3) Floodplains
4) Steep slopes 25% or greater

Secondary Conservation Areas
1) Mature woodlands
2) Upland buffers around wetlands and water bodies
3) Prime farmlands and forest lands
4) Natural Meadows
5) Critical wildlife habitat
6) Sites of historic, cultural and archaeological significance

### The Process

Remove unbuildable areas from total acres. Now determine total number of lots based on acreage of secondary conservation and other buildable acreage. *(Density Neutral)* Now cluster this number to save secondary conservation areas.

Up to ½ area of the buildable area (secondary conservation and other buildable areas) can be subdivided for residential, the balance of buildable remains undivided open space. Of this protected open space, ½ could be left natural and ½ developed for active, formal recreation such as parks, ball fields, etc.

Another simplified explanation is remove non-buildable acres,
then within the buildable area,
¼ is undisturbed open space
¼ is modified open space for active recreation
½ is developed as residential, at twice the normal density. Note the percentages can very depending the desires of the community

**Summary of steps**

1) Identifying all potential conservation areas
2) Locating house sites
3) Designing street alignments and trails
4) Drawing lot lines

**Environmental and Ecological Benefits**

1) Protect upland buffers along wetlands, water courses and water bodies
2) Wildlife corridors
3) Filter stormwater flowing to ponds, lakes and rivers
4) Trap nutrients and pollutants from stormwater
5) Slows stormwater velocity which reduces erosion
6) Cooling effect for wildlife, water and homes
7) Buffer width for residential – 100 feet @ 8 percent slope
8) Connect riparian woodlands as corridors

**Developing Area-wide map of conservation and development areas**

1) Wetlands
2) 100 year floodplain
3) Steep slopes 25% or greater
4) Habitats of species that are endangered, threatened, or significant, unique or special areas
5) Historic, archaeological or cultural sites listed on “National Register of Historic Places” or state or local inventories.
6) Active farmland and forestland rated as prime or state-wide importance
7) High yielding aquifers and recharge areas
8) Woodlands of a size locally significant or mature woodlands one or more acres in size.

# Native Trees

| Common Name | *Scientific Name* |
|---|---|
| Ash, black | *Fraxinus nigra* |
| Ash, red or green | *Fraxinus pennsylvanica* |
| Ash, white | *Fraxinus americana* |
| Aspen, bigtooth | *Populus grandidentata* |
| Aspen, trembling | *Populus tremuloides* |
| Basswood | *Tilia americana* |
| Beech, American | *Fagus grandifolia* |
| Birch, paper | *Betula papyrifera* |
| Birch, yellow | *Betula alleghaniensis* |
| Cedar, northern white- | *Thuja occidentalis* |
| Cherry, black | *Prunus serotina* |
| Cherry, fire or pin | *Prunus pensylvanica* |
| Fir, balsam | *Abies balsamea* |
| Hemlock | *Tsuga canadensis* |
| Ironwood; hop hornbeam | *Ostrya virginiana* |
| Maple, mountain | *Acer spicatum* |
| Maple, red | *Acer rubrum* |
| Maple, striped | *Acer pensylvanicum* |
| Maple, sugar | *Acer saccharum* |
| Oak, red | *Quercus rubra* |
| Pine, jack | *Pinus banksiana* |
| Pine, red | *Pinus resinosa* |
| Pine, white | *Pinus strobus* |
| Poplar, balsam | *Populus balsamifera* |
| Serviceberry, Allegheny | *Amelanchier laevis* |
| Serviceberry, shadblow | *Amelanchier arborea* |
| Spruce, black | *Picea mariana* |
| Tamarack; larch | *Larix laricina* |

# Native Ferns

| Common Name | *Scientific Name* |
|---|---|
| Bracken fern* | *Pteridium aquilinum* |
| Cinnamon fern | *Osmunda cinnamomea* |
| Interrupted fern | *Osmunda claytoniana* |
| Lady Fern, northern | *Athyrium filix-femina* |
| Maidenhair fern | *Adiantum pedatum* |
| Oak fern | *Gymnocarpium dryopteris* |
| Ostrich fern | *Matteuccia struthiopteris* |
| Rattlesnake fern | *Botrychium virginianum* |
| Royal fern | *Osmunda regalis* |
| Sensitive fern | *Onoclea sensibilis* |
| Woodfern; crested shield fern | *Dryopteris cristata* |
| Woodfern, evergreen | *Dryopteris intermedia* |
| Woodfern, Goldie's | *Dryopteris goldiana* |

# Native Shrubs

| Common Name | *Scientific Name* |
|---|---|
| Alder, speckled | *Alnus rugosa* |
| Bearberry | *Arctostaphylos uva-ursi* |
| Blackberry, highbush | *Rubus allegheniensis* |
| Blueberry | *Vaccinium angustifolium* |
| Blueberry, velvetleaf | *Vaccinium myrtilloides* |
| Chokeberry, black | *Aronia prunifolia* |
| Chokecherry | *Prunus virginiana* |
| Cinquefoil, shrubby | *Potentilla fruticosa* |
| Currant, swamp red | *Ribes triste* |
| Currant, wild black | *Ribes americanum* |
| Cranberry, highbush | *Viburnum trilobum* |
| Dewberry, northern | *Rubus flagellaris* |
| Dogwood, alternate-leaf | *Cornus alternifolia* |
| Dogwood, red-osier | *Cornus stolonifera* |
| Dogwood, roundleaf | *Cornus rugosa* |
| Elder, red-berried | *Sambucus racemosa* |
| Elderberry, American | *Sambucus canadensis* |
| Gooseberry, prickly | *Ribes cynosbati* |
| Hazelnut, beaked | *Corylus cornuta* |
| Holly, Michigan | *Ilex verticillata* |
| Holly, mountain | *Nemopanthus mucronatus* |
| Honeysuckle, American fly | *Lonicera canadensis* |
| Honeysuckle, bush- | *Diervilla lonicera* |
| Juniper, creeping | *Juniperus horizontalis* |
| Juniper, ground | *Juniperus communis* |
| Leatherwood | *Dirca palustris* |
| Meadowsweet | *Spiraea alba* |
| Nannyberry | *Viburnum lentago* |
| Ninebark | *Physocarpus opulifolius* |
| Partridge berry | *Mitchella repens* |
| Raspberry, wild red | *Ribes triste* |
| Rose, swamp | *Rosa palustris* |
| Rose, wild | *Rosa blanda* |
| Serviceberry, round-leaved | *Amelanchier sanguinea* |
| Snowberry | *Symphoricarpos albus* |
| Sumac, staghorn | *Rhus typhina* |
| Sweet gale | *Myrica gale* |
| Sweet-fern | *Comptonia peregrina* |
| Trailing arbutus | *Epigea repens* |
| Viburnum, mapleleaf | *Viburnum acerifolium* |
| Willow; pussy | *Salix discolor* |
| Willow, sandbar | *Salix exigua* |
| Wintergreen | *Gaultheria procumbens* |
| Withe-rod, wild raisin | *Viburnum cassinoides* |
| Yew, Canadian | *Taxus canadensis* |

# Native Wildflowers

| Common Name | *Scientific Name* |
|---|---|
| Anemone, Canada | *Anemone canadensis* |
| Anemone, wood | *Anemone quinquefolia* |
| Aster, big-leaved* | *Aster macrophyllus* |
| Aster, smooth* | *Aster laevis* |
| Baneberry, red* | *Actaea rubra* |
| Baneberry, white * | *Actaea pachypoda* |
| Bee balm* | *Monarda fistulosa* |
| Bellwort | *Uvularia grandiflora* |
| Black-eyed Susan* | *Rudbeckia hirta* |
| Bloodroot* | *Sanguinaria canadensis* |
| Blue cohosh | *Caulophyllum thalictroides* |
| Bluebead-lily | *Clintonia borealis* |
| Boneset | *Eupatorium perfoliatum* |
| Bunchberry* | *Cornus canadensis* |
| Canada mayflower* | *Maianthemum canadense* |
| Columbine, wild* | *Aquilegia canadensis* |
| Coneflower, cut-leaved | *Rudbeckia laciniata* |
| Coreopsis, sand | *Coreopsis lanceolata* |
| Dutchman's breeches | *Dicentra cucullaria* |
| Evening primrose | *Oenothera biennis* |
| Gay-wings | *Polygala paucifolia* |
| Gentian, closed | *Gentiana andrewsii* |
| Golden ragwort | *Senecio aureus* |
| Goldenrod, early | *Solidago juncea* |
| Goldenrod, grass-leaved | *Euthamia graminifolia* |
| Goldenrod, gray | *Solidago nemoralis* |
| Goldthread | *Coptis trifolia* |
| Harebell | *Campanula rotundifolia* |
| Hepatica, round-lobed* | *Hepatica americana* |
| Hepatica, sharp-lobed* | *Hepatica acutiloba* |
| Herb Robert* | *Geranium robertianum* |
| Iris, wild blue-flag* | *Iris versicolor* |
| Jack-in-the-pulpit | *Arisaema triphyllum* |
| Jewelweed | *Impatiens capensis* |
| Joe-pye weed | *Eupatorium maculatum* |
| Leek, wild | *Allium tricoccum* |
| Loosestrife, fringed | *Lysimachia ciliata* |
| Marsh marigold | *Caltha palustris* |
| Meadow-rue, purple | *Thalictrum dasycarpum* |
| Milkweed, common | *Asclepias syriaca* |
| Milkweed, swamp | *Asclepias incarnata* |
| Miterwort; Bishop's cap | *Mitella diphylla* |
| Miterwort, naked | *Mitella nuda* |
| Monkey-flower | *Mimulus ringens* |
| Sarsaparilla, wild* | *Aralia nudicaulis* |
| Skullcap, mad-dog | *Scutellaria lateriflora* |
| Solomon's seal, downy* | *Polygonatum pubescens* |
| Solomon-seal, false* | *Smilacina racemosa* |
| Solomon-seal, starry false* | *Smilacina stellata* |
| Spikenard | *Aralia racemosa* |
| Spring beauty, Carolina | *Claytonia caroliniana* |
| Squirrel-corn | *Dicentra canadensis* |

# Native Wildflowers (Cont.)

| Common Name | *Scientific Name* |
|---|---|
| Starflower* | *Trientalis borealis* |
| Strawberry, wild* | *Fragaria virginiana* |
| Sweet-Cicely, hairy | *Osmorhiza claytonii* |
| Thimbleweed | *Anemone virginiana* |
| Toothwort, two-leaved | *Dentaria diphylla* |
| Trout lily, yellow | *Erythronium americanum* |
| Turtlehead | *Chelone glabra* |
| Twinflower* | *Linnaea borealis* |
| Twisted-stalk, rose | *Streptopus roseus* |
| Vervain, blue | *Verbena hastata* |
| Violet, downy yellow | *Viola pubescens* |

# Native Grasses, Rushes & Sedges

| Common Name | *Scientific Name* |
|---|---|
| Bluestem, big | *Andropogon gerardii* |
| Bluestem, little | *Schizachyrium scoparium* |
| Bottlebrush grass | *Hystrix patula* |
| Bulrush, hardstem | *Scirpus acutus* |
| Bulrush, softstem | *Scirpus validus* |
| Rush, path | *Juncus tenuis* |
| Rush, soft-stemmed | *Juncus effusus* |
| Sedge | *Carex comosa* |
| Sedge | *Carex crinita* |
| Sedge | *Carex intumescens* |
| Sedge, Pennsylvania* | *Carex pensylvanica* |
| Sedge, tussock | *Carex stricta* |
| Wild-rye, Canada | *Elymus canadensis* |
| Wild-rye, Virginia | *Elymus virginicus* |
| Wood grass, long-awned | *Brachyelytrum erectum* |
| Wool-grass | *Scirpus cyperinus* |

* Suitable for use as groundcover

**Invasive Plants – Michigan Association of Conservation Districts**

A small but significant number of landscape plants commonly "escape" from planted gardens and invade and destructively alter our natural areas. These species axe dispersed by birds, wind or water. Since people have little or no control of these things, the spread of these plants is very difficult to stop. Once established in the landscape, they crowd out many native plants. These invasive often do extremely well in very broad growing conditions— wet to dry and sunny to shady— making them popular within the nursery trade. An example of a very successful invasive, autumn olive often produces leaves several weeks before the surrounding native plants and keeps these leaves several weeks longer in the *fall.* This enables it to extend its growing season, an important factor in the plant's success. When invasives are so successful, they often exclude or crowd out native vegetation. Controlling the invasives is difficult and expensive, and often requires the use of herbicides.

For these reasons, we recommend not using these plants and their varieties and cultivars in your landscape:

| | |
|---|---|
| Autumn olive | *Elaeagnus umbellata* |
| Birdsfoot trefoil | *Lotus corniculata* |
| Buckthorn | |
| Common buckthorn | *Rhamnus cathartica* |
| Glossy 'Tall hedge" Buckthorn | *Rhamnusfrangula* |
| Crown vetch | *Coronilla varia* |
| Dame's rocket | *Hesperis matronalis* |
| (Goutweed | *Aegopodium podagraria* |
| Honeysuckle | *Lonicera tatarica, L.japonica, L. ,maackii, L. morrowi, L. x-bella &* their cultivars |
| Leafy spurge | *Euphorbia esula* |
| Multiflora rose | Rosa *multiflora* |
| Norway maple | *Acer platanoides* |
| Oriental bittersweet | *Celastrus orbiclatus* |
| Periwinkle (Myrtle) | *Vinca minor* |
| Purple loosestrife | *Lythrum salicaria* |
| Queen Anne's lace | *Daucus carota* |
| Reed Canary Grass | *Phalaris arundinacea* |
| Smooth brome | *Bromus inermis* |
| White sweet clover | *Melilotus alba* |

Be wary of "sterile" varieties - we have seen no proof of these claims. In fact, we know that pollen from "sterile" purple loosestrife will fertilize wild purple loosestrife plants.

## Problem-Prone Plants Require More Care

| | |
|---|---|
| *Acer negundo*<br>**Boxelder** | A very weak-wooded, native tree that plays host to home-invading boxelder bugs. Not worth the fast shade it provides. Seedlings become noxious and persistent weeds. |
| *Betula pendula*<br>**European white birch** | A popular tree with homeowners, who plant it unaware of the mandatory applications of pesticides necessary to fight leafminer and bronze birch borer to keep the tree alive just a little longer. |
| *Eleagnus angustifolia*<br>**Russian olive** | Don't be tempted by the silvery gray foliage. Canker and Verticillium wilt destroy that silvery silhouette by killing many branches. |
| *Picea pungens*<br>**Colorado spruce** | Becomes a very tall blue tower decorated with galls at the branch tips as Cytospora canker disfigures the tree at an early age. |
| *Populus species*<br>**Poplars** | Active trees that drop leaves and branches because of aphids, borers, cankers, galls, leaf blisters and spots, powdery mildew, rusts and scales. |
| *Prunus cerasifera*<br>**Purpleleaf plum cultivars**<br>*Prunus x cistena*<br>**Purpleleaf plum** | Overused plants favored by numerous insects and diseases. The purple foliage is prized for the brief time the plant survives in landscapes. |
| *Rosa multiflora*<br>**Japanese or multiflora rose** | An aggressive, thicket-forming, impenetrable bramble that moves in and takes over. If found in your garden, it should be removed while still small. |
| *Salix species*<br>**Willow** | A weakling susceptible to twig blight, crown gall, various cankers, borers, leaf spots, powdery mildew, scales, aphids, imported willow leaf beetle and galls. Fast growing and easily damaged by ice and wind storms. |
| *Sorbus aucuparia*<br>**European mountain ash** | Scales, mountain ash sawfly, scab, cankers and borers weaken the tree, with attacks of fire blight usually fatal. |
| *Syringa vulgaris*<br>**Common lilac** | Powdery mildew, scales, borers and bacterial blight, plus the regular pruning needed to control height and suckering, cause many gardeners to become dissatisfied. |
| *Ulmus pumila*<br>**Siberian elm** | Fast growth, brittle wood, litter and dark green foliage loved by elm leaf beetles that invade homes in the fall make this a tree that detracts from a beautiful landscape. |

## Michigan's Lower Peninsula Weeds

USFS – Hiawatha National Forest, Conservation Districts, Michigan Association of Conservation Districts, Margaret Boyle.

Information on selected invasive species of the Eastern Region of the US Forest Service. This information has been compiled from various sources. Gleason and Cronquist's "Manual of Vascular Plants of Northeastern United States and Adjacent Canada" provided information regarding taxonomic authority, common names, habitat and native range. Eastern Region (USFS) invasive plants, ranked by degree of invasiveness, are based on information from States. Voss's "Michigan Flora" provided information on presence within Michigan's Lower Peninsula. Degree of invasiveness varies with specific site conditions. Non-natives may be non-invasive in some situations and highly invasive in others. Exotic species that do not appear in this brochure have the potential to be highly invasive. Many species have escaped cultivation and should be monitored.

Categories:
1. Highly invasive
2. Moderately invasive
3. Widespread exotic (non-native)

Category I Plants - Highly Invasive

*These plants are all non-native, highly invasive p/ants which invade natural habitats and replace native species.*

| **Scientific Name** | **Common Name** |
|---|---|
| Acer platanoides | Norway maple |
| *Aiianthus altissima* | Tree-of-heaven |
| *Alliaria petiolata* | Garlic mustard |
| *Berberis thunbergii* | Japanese barberry |
| *Butomus umbellatus* | Flowering rush |
| *Centaurea maculosa* | Spotted knapweed |
| *Coronilla varia* | Crown vetch |
| *Elaeagnus angustifolia* | Russian olive |
| *Elaeagnus urnbellata* | Autumn olive |
| *Euphorbia esula* | Leafy spurge |
| *Lonicera maackii* | Amur honeysuckle |
| *Lonicera morrowii* | Fly honeysuckle |
| *Lonicera tatarica* | Tartarian honeysuckle |
| *Lonicera x bella* | Bell's honeysuckle |
| *Lythrum salicaria* | Purple loosestrife |
| *Myriophyllum spicatum* | Eurasian water-milfoil |
| *Polygonum cuspidatum* | Japanese knotweed |
| *Potamogeton crispus* | Curly pondweed |
| *Rhamnus cathartica* | Common buckthorn |
| *Rhamnus frangula* | Smooth buckthorn |

Category 2 - **Plants - Moderately Invasive**

*These plants are less invasive than those in Category 1. If these species are significantly replacing native species, then they are doing so only in local areas.*

| **Scientific Name** | **Common Name** |
|---|---|
| A*egopodium podagraria* | Goutweed |
| *Berberis vulgaris* | Common barberry |
| *Bromus inermis* | Smooth brome |
| *Cirsium arvense* | Canada thistle |
| *Cirsium palustre* | Marsh thistle |
| *Epilobium hirsutum* | Hairy willow-herb |
| *Euonymus alata* | Winged euonymus |
| *Euonymus fortunei* | Wintercreeper |
| *Festuca elatior* | Tall-fescue |
| *Festuca pratensis* | Meadow-fescue |
| *Hesperis matronalis* | Dame's rocket |
| *Iris pseudacorus* | Yellow iris |
| *Ligustrum vulgare* | European privet |
| *Lysimachia nummularia* | Moneywort |
| *Melilotus alba* | White sweet clover |
| *Melilotus officinalis* | Yellow sweet clover |
| *Najas minor* | Naiad |
| *Nasturtium officinale* | Watercress |
| *Poa compressa* | Canada bluegrass |
| *Poa pratensis* | Kentucky bluegrass |
| *Rosa multiflora* | Multiflora rose |
| S*orghum halepense* | Johnson grass |
| *(Jlmus pumila* | Siberian elm |
| *Valeriana officinalis* | Garden-heliotrope |
| *Vinca minor* | Greater periwinkle |
| *Vincetoxicum nigrum* | Slack swallow-wort |
| *Vincetoxicum rossicum* | Swallow-wort |

Category 3 Plants - **Widespread Non-native Species**

*These plants are often restricted to disturbed ground and are not especially invasive in undisturbed natural areas. Most of these species are found throughout much of our range.*

| **Scientific Name** | **Common Name** |
|---|---|
| *Abutilon theophrasti* | Velvet-leaf |
| *Ajuga reptans* | Carpet-bugle |
| *Allium vineale* | Wild garlic |
| *Amaranthus hybridus* | Green amaranthus |
| *Amaranthus retroflexus* | Pigweed |
| *Anthoxanthum odoratum* | Sweet vernal grass |
| *Arctium minus* | Common burdock |
| *Arenaria serpyllifolia* | Thyme-leaf sandwort |

Category 3 Plants - **Widespread Non-native Species (Continued)**

| **Scientific Name** | **Common Name** |
|---|---|
| *Arrhenatherum elatius* | Tall oat-grass |
| *Asparagus officinalis* | Asparagus |
| *Bromus squarrosus* | Brome |
| *Bromus tectorum* | Downy chess |
| *Campanula rapunculoides* | Creeping bellflower |
| *Capsella bursa-pastoris* | Shepard's purse |
| *Cardamine pratensis* | Cookoo-flower |
| *Carduus acanthoides* | Plumeless thistle |
| *Carduus nutans* | Musk thistle |
| *Centaurea spp.* | knapweed |
| *Cerastium fontanum* | Common mouse-ear |
| *Chelidonium majus* | Greater celandine |
| *Chloris verticillata* | Windmill grass |
| *Chrysanthemum leucanthemum* | Ox-eye daisy |
| *Cichorium intybus* | Chicory |
| *Cirsium vulgare* | Bull thistle |
| *Commelina communis* | Dayflower |
| *Conium maculatum* | Poison hemlock |
| *Convolvulus arvensis* | Field-bindweed |
| C*ycloloma atriplicifolium* | Winged pigweed |
| *Cytisus scoparius* | Scotch broom |
| *Dactylis glomerata* | Orchard-grass |
| *Datura stramonium* | Jimsonweed |
| *Daucus carota* | Queen Anne's lace |
| *Dianthus armeria* | Deptford pink |
| *Dipsacus fullonum* | Teasel |
| Dipsacus laciniatus | Cut-leaved teasel |
| Echinochloa crusgalli | Barnyard-grass |
| *Echium vulgare* | Viper's bugloss |
| *Elytrigia repens* | Quackgrass |
| *Epipactis helfeborine* | Helleborine |
| *Euphorbia cyparissias* | Cypress spurge |
| F*umaria officinalis* | Fumitory |
| *Galeopsis tetrahit* | Hemp-nettle |
| *Galinsoga quadriradiata* | Quickweed |
| *Galium mollugo* | Wild madder |
| *Galium verum* | Yellow bedstraw |
| *Glechoma hederacea* | Gill-over-the-ground |
| *Hemerocallis fulva* | Orange day-lily |
| *Hieracium aurantiacum* | Orange hawkweed |
| *Hieracium lachenalii* | Hawkweed |
| *Humulus lupulus* | Hops |

| | |
|---|---|
| *Hypericum perforatum* | St. John’s wort |

Category 3 Plants - **Widespread Non-native Species (Continued)**

| Scientific Name | Common Name |
|---|---|
| *Lactuca serriola* | Prickly lettuce |
| *Lamium maculatum* | Red dead nettle |
| *Lapsana communis* | Nipplewort |
| *Leonurus cardiaca* | Motherwort |
| *Lespedeza cuneata* | Chinese lespedeza |
| *Lespedeza stipulacea* | Korean clover |
| *Linaria vulgaris* | Butter-and-eggs |
| *Lolium perenne* | Rye grass |
| *Lotus corniculata* | Bird's foot trefoil |
| *Malva moschata* | Musk-mallow |
| *Malva neglecta* | Common mallow |
| *Matricaria discoidea* | Pineapple-weed |
| *Medicago sativa* | Black medic |
| *Morus alba* | White mulberry |
| *Myosotis scorpioides* | Forget-me-not |
| *Nepeta cataria* | Catnip |
| *Pastinaca sativa* | Wild parsnip |
| *Penstemon digitalis* | False foxglove |
| *Phleum pratense* | Timothy |
| *Picris hieracioides* | Ox-tongue |
| *Plantago lanceolata* | Plantain |
| *Poa annua* | Annual bluegrass |
| *Potentilla argentea* | Silvery cinquefoil |
| *Potentilla recta* | Sulpher cinquefoil |
| *Prunella vulgaris* | Heal-all |
| *Ranunculus acris* | Tall buttercup |
| *Ranunculus repens* | Creeping buttercup |
| *Robinia hispida* | Rose-acacia |
| *Rudbeckia hirta* | Black-eyed Susan |
| *Rumex acetosella* | Sheep sorrell |
| *Saponaria officinalis* | Soapwort |
| *Sedum acre* | Yellow sedum |
| *Sedum telephium* | Live forever |
| *Senecio vulgaris* | Bladder campion |
| *Solanum dulcamara* | Climbing nightshade |
| *Sonchus arvensis* | Field sow-thistle |
| *Sonchus asper* | Prickly sow-thistle |
| *Sonchus oleraceus* | Common sow-thistle |
| *Stellaria graminea* | Common stitchwort |
| *Tanacetum vulgare* | Tansy |
| *Taraxacum officinale* | Common dandelion |
| *Thlaspi arvense* | Field pennycress |
| *Tragopogon pratensis* | Yellow goat's beard |
| *Trifolium repens* | White clover |
| *Trifolium spp*. | Clover |

Category 3 Plants - **Widespread Non-native Species (Continued)**

| **Scientific Name** | **Common Name** |
|---|---|
| *Verbascum blattaria* | Moth-muellin |
| *Verbascum thapsus* | Giant muellin |
| V*eronica officinalis* | Speedwell |
| *Vicia cracca* | Cownvetch |
| *Xanthium strumarium* | Common cocklebur |